

**District of Columbia  
HIV/AIDS Behavioral Surveillance  
Summary and Technical Reports  
2008**

A Public Health/Academic Partnership between the

District of Columbia Department of Health  
and  
The George Washington University School of  
Public Health and Health Services  
Department of Epidemiology and Biostatistics

Contract Number POHC-2006-C-0030



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## ***The Modern Epidemic: HIV/AIDS in the District of Columbia***

Washington, DC, has the highest HIV/AIDS rate in the United States, yet surprisingly little is known about the sexual behaviors people engage in before they become infected. In addition, we know very little about other HIV-related risk behaviors, HIV testing behaviors, and access to prevention services among people who are not already in care. The most recent District of Columbia, HIV/AIDS, Epidemiology Annual Report (2007) characterizes the “Modern Epidemic” in Washington, DC, based on surveillance data:

- ✓ Washington, DC has the highest HIV/AIDS case rate nationally (128.4 cases per 100,000 population compared to 14.0 cases per 100,000 population in the US).
- ✓ Washington, DC’s newly reported AIDS cases is higher than rates found in similarly sized cities Baltimore, Philadelphia, New York City, Detroit, and Chicago.
- ✓ Heterosexual contact leads new transmissions (~37% of newly reported infections).
- ✓ Heterosexual contact was most common mode of acquisition of HIV (61%) for women; in addition, 23% of new HIV cases were among women with no identified risk.
- ✓ Black women constitute only 58% of the District’s female population, but they account for 90% of all new female HIV cases and 93% of living AIDS cases among women.
- ✓ Although black residents account for only 57% of the District’s population, they account for 81% of new reports of HIV cases and approximately 86% of living AIDS cases.

HIV and AIDS surveillance data suggest that alongside concentrated epidemics among men who have sex with men (MSM) and injecting drug users (IDU), a generalized epidemic may be emerging among heterosexuals at high risk for HIV/AIDS in the



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District of Columbia. UNAIDS/WHO defines generalized HIV epidemics as those where more than 1% of the adult (ages 15 to 59 years) population is HIV-positive. Up to now, the United States has been in the category of concentrated epidemics, where HIV prevalence is elevated in specific high-risk populations, MSM and IDU. But the estimated prevalence of HIV/AIDS that surveillance data suggest, ranging from 3% to 5%, is not dissimilar to those found among heterosexual epidemics around the world. With heterosexual transmission on the rise and black women at increased risk, we need to find ways to halt the emerging generalized epidemic among heterosexuals in the District of Columbia.

Certain sexual risk behaviors have been identified in studies of other generalized, heterosexual epidemics in developing countries, as well as among black heterosexual women in the rural Southern United States. These include:

- ✓ Substantial poverty
- ✓ Early sexual debut
- ✓ Concurrency (having more than one sexual partner at a time)
- ✓ Multiple sexual partners
- ✓ Lack Of condom use
- ✓ Substance abuse
- ✓ Depression
- ✓ Fewer men being circumcised.

How each of these affects the epidemic can depend on the characteristics of the epidemic: how long it has been in the area, how many people are already HIV-positive, how quickly the virus is being transmitted, and other factors. These factors in turn may drive generalized epidemics in places with early and established HIV epidemics, not only in immature epidemics as had been thought early on. This means that it may not be too late to slow the epidemic if we can understand HIV risk behavior and work together to change it. Understanding risk behavior in the District will help us create and adapt innovative prevention strategies.



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## **How can we learn what people are doing that puts them at risk? National HIV Behavioral Surveillance (NHBS)**

Surveillance data reveal just the tip of the iceberg: they provide information about people who enter the care system, are tested for HIV, or develop AIDS—but not about risks people are taking *before* they enter care and *before* they become infected or diagnosed with HIV. If we do not know what people in the community are doing that puts them at risk for HIV before they are infected, it is almost impossible to design interventions to reduce their risk. A greater understanding of risk behaviors that District residents are engaging in is a critical step towards reducing the burden of HIV disease here.

The National HIV Behavioral Surveillance (NHBS) system is a CDC-funded surveillance study conducted in 25 cities in the United States. The purpose of NHBS is to learn about what people do that puts them at risk for HIV. NHBS focuses on three at risk populations: men who have sex with men (NHBS-MSM), injecting drug users (NHBS-IDU), and heterosexuals at risk of HIV infection (NHBS-HET). Each year the study is done in one of these three populations. The 2006-7 year discussed in this report was NHBS-HET.

### ***How does NHBS work?***

NHBS uses a detailed survey to collect information about participants in several areas:

- ✓ Sexual behavior
- ✓ Drug and alcohol use behavior
- ✓ HIV testing behavior and perceptions
- ✓ Use of local prevention services.

For the 2006-7 NHBS-HET year, the focus was on people who fit the CDC definition of heterosexuals at high risk for HIV: males and females 18 years and over who had sex



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with a member of the opposite sex in the past 12 months and had some physical or social connection to a geographically-defined high risk area. The high risk areas were defined by a CDC-developed algorithm that looked most closely at areas in the District with the highest poverty rates *and* the highest AIDS rates between 2001 and 2006. While any otherwise eligible person could be in the study, NHBS-HET focused on people in areas with the most poverty in the city and the highest AIDS rates, shown in Figure 1.

**Figure 1: Relationship between HRA clusters and DC Wards.**



The NHBS survey was administered to participants face-to-face by a trained WORD UP interviewer. The method for finding participants was called respondent-driven sampling (RDS). With RDS, eligible participants refer up to three friends, relatives, sex partners, and others from their social networks who then come in to take the survey; then they refer friends, and so on, like a snowball. The study was conducted at Family and Medical Counseling Service, Inc., in Anacostia, which provides a range of health care and psychosocial services, including HIV testing and healthcare.

In order to be eligible for the study, participants had to:



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- ✓ Be an adult in the age range of the study
- ✓ Have had sex with a member of the opposite gender in the past 12 months
- ✓ Have a study coupon, given to them by a spouse, relatives, sexual partners, co-worker, or others they knew
- ✓ Be willing and able to give informed consent.

Following a 30 to 40 minute survey, participants were offered an anonymous oral rapid HIV test. All participants were given risk reduction materials, free condoms, and referral into services as needed. Participants who screened HIV-positive were immediately referred into care at Family Medical and Counseling Service, Inc. or the clinic of their choice. Participants received \$25.00 for answering the survey questions and up to \$30.00 for referring other eligible people; those who wanted to test for HIV received an additional \$10.00. Individuals who were not eligible for the study but who wanted an HIV test were given information about where they could get a free test.

A key feature of NHBS is that it is community-based—asking about what healthy people do and not those who are at a clinic seeking healthcare because they are ill. This removes some of the biases that studies that look only at clinic and hospital populations have. Because RDS was used to find people to participate in the study, this study's findings can be used to understand not only the participants themselves, but people similar to the participants as well (they can be generalized to the population of people similar to the sample). These estimates of behavior can then inform our understanding of local needs better than those from samples of individuals seeking care at clinics or hospitals.

NHBS is conducted by the George Washington University, School of Public Health and Health Services (GWU), Department of Epidemiology and Biostatistics faculty and staff, and funded by the Department of Health/HIV-AIDS Administration (DC DOH/HAA) as a part of its Public Health/Academic Partnership with DC DOH/HAA. This study is known locally as the WORD UP Study (Washington Outreach Research Drive to Understand



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Prevention). All protocol activities are guided by a multi-site protocol developed and overseen by the CDC, approved jointly by the DC DOH and GWU Institutional Review Boards (IRB), and with the guidance of the WORD UP Community Advisory Board (CAB).

## Results

Between December 2006 and October 2007:

- ✓ 1,144 people were screened
- ✓ 910 eligible people completed the interview
- ✓ 750 of those had complete data available for analysis and were eligible for this analysis.

### ***Who were the participants?***

- ✓ The majority of participants was over 30 (61.4%), black (92.3%), never been married (61.6%), and reported a heterosexual orientation (89.5%).
- ✓ More than a third (37.6%) had less than a high school degree, and the majority had attained a high school degree or less (85.7%).
- ✓ More than a third (43.7%) of the participants was unemployed, 60.0% reported an annual household income of less than \$9,999, and 21.8% had ever been homeless (with 13.9% currently homeless).
- ✓ Nearly a fifth (18.7%) of participants had no health insurance. Of the participants with health insurance, 91.8% were insured by Medicaid or Medicare.

### ***→What does this mean?***

- *The findings of this study are not applicable to the larger group of all heterosexuals in Washington, DC. Findings may be generalized to the population of people similar to the sample, but should not be applied to heterosexuals in general.*



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✓ **Elevated rates of HIV among heterosexuals in high risk areas of the city**

- Nearly 1 in 19 participants screened HIV-positive [5.2% (95% CI 2.9% - 7.2%)].
  - Nearly half of these (47.4%, 95% CI 30.9%-78.7%) did not know their HIV-status prior to being in the study.
- More women tested positive than men: 6.3% (95% CI 3.3%-9.7%) of women were positive vs. 3.9% (95% CI 1.6%-5.7%) of men.

→**What does this mean?**

- *There was considerable HIV infection among this sample of heterosexual individuals*
- *This prevalence in a community-based samples echoes that found in the surveillance and suggests the emergence of a generalized HIV epidemic among heterosexuals at high risk for HIV as defined by the study criteria in Washington, DC.*
- *Women were more likely to screen HIV-positive than men.*

✓ **Condoms are not being used.**

- People are not using condoms:
  - 71.2% of participants reported that their last vaginal intercourse was unprotected.
    - In addition, of those who tried to use a condom during vaginal sex, in 5.7% the condom was not used the whole time.
  - 100.0% of participants reported that their last anal intercourse was unprotected.
- 52.3% of the participants indicated that they had received free condoms in the past 12 months



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- Of those, 59.5% reported using the free condoms
  - Of those, 77.3% felt that getting the free condoms made them more likely to use condoms.
- Men were significantly more likely than women to use free condoms if they got them (63.7% vs. 56.4%)
- Women were significantly more likely than men to perceive that getting free condoms made him or her more likely to use them (86.2% vs. 63.0%).

**→What does this mean?**

- *Most sexual encounters are not being protected by condoms, putting the individuals and their partners at risk for HIV and other sexually transmitted diseases.*
  - *If you have sex with someone, chances are that the last time they had sex, they did not use a condom.*
- *There are considerable opportunities to reduce risk of HIV by just increasing condom use.*
- *Free condoms seem to help people use condoms, but it is not always enough. Specialized interventions to improve condom use are desperately needed.*
- *Men and women may need different interventions to help improve condom use. A one-size-fits-all approach may not work.*

**✓ Having more than one sexual partnership at a time is common, even for people with primary and stable partners**

- Participants reported that the majority of their most recent sex partners were main partners (74.2%); relatively few were casual (18.9%) or exchange (7.0%) partners (partners that they had sex with for money, shelter, drugs, etc.).
- 57.9% reported having  $\geq 2$  sexual partners in the past 12 months.



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- In estimating concurrency (how many had or believed their partners had sex with someone else during the partnership)
  - 44.9% reported that they themselves had sex with someone else during the past 12 months of the relationship.
    - Women were significantly less likely than men to report having had a sexual partnership with someone outside of the relationship in the past 12 months (40.3% vs. 53.0%).
  - 45.9% believed their last sex partner definitely or probably had sex with someone else during the past 12 months of the relationship.

**→What does this mean?**

- *Even in stable or primary relationships, having sex outside of the partnership is common. This makes it important that condoms are used all the time, even in relationships that are main relationships.*
- *Concurrency has been shown in many studies in the United States and abroad to be a key factor in the emergence of heterosexual HIV epidemics.*
- *Effective interventions for teaching condom negotiation skills to people in stable or primary relationships are needed. These may require a different approach than used for other target populations.*

**✓ At the time this study was conducted, routine HIV testing had not yet become standard of care and there are substantial missed opportunities for HIV screening**

- 79.7% of participants had seen a healthcare provider in the past 12 months
  - Of those, nearly half (49.4%) were *not* offered an HIV test.
- 87.9% of participants had tested for HIV at least once in their lives, but only 60.9% were tested in the past 12 months.



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- 31.4% of participants had heard about the District of Columbia HIV testing initiative
  - Of those, 64.1% reported that the initiative “made them want to get HIV tested.”
- Of those who were not tested in the past 12 months the most common reasons included
  - Being afraid of having HIV (39.7%)
  - Not liking needles (33.8%)
  - Not having money or insurance for testing (25.7%)
  - Not having time (23.9%)
  - Being worried someone would find out about their test result (28.6%)
  - Perceiving that they are at low risk for HIV (22.8%)
  - Being afraid of losing family/friends (18.8%)
  - Not knowing where to get tested (17.7%).

**→What does this mean?**

- *In the 2006-7 study year, routine screening and the District’s testing initiative had just been launched. At that time, many people were seeing their healthcare providers and not being offered HIV tests.*
- *Routine screening for HIV, as recommended by the 2006 CDC guidelines, is an important method of identifying HIV-positive individuals and engaging them in care. Reducing missed opportunities for care starts with the healthcare provider by offering HIV tests on a routine basis—not only when they appear at risk or are sick.*
- *Community based screening at health care events, by community-based organizations can work well in conjunction with routine screening to advance HIV testing in innovative and non-traditional settings.*
- *HIV testing needs to be actively paired with innovative strategies for engaging and retaining HIV-positive persons in appropriate healthcare.*



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- *There are multiple misconceptions about HIV-testing. People should know that:*
  - *HIV testing can be done for free, without needles, quickly, and at multiple locations within the District.*
  - *Testing is 100% confidential and results are not shared with anyone.*
  - *People who test HIV-positive can get low-cost or free treatment that can help them stay healthy. Support services are available to assist individuals in dealing with family and social support issues that can occur when finding out one is HIV-positive.*
- ✓ **Many other risk factors for HIV infection were also identified.**
  - 69.2% of participants had their first sexual experience at 16 years or younger
    - 23.1% of participants had their first sexual experience at 13 years or younger.
  - 60.2% of participants had used non-injection drugs in the past 12 months
    - 14.1% of participants had injected drugs in their lifetimes, but not in the 12 months prior to the interview.
  - 48.9% of participants used drugs and/or alcohol at their last sexual interactions
  - 37.9% of participants reported that they were emotionally or physically abused at least once in their lives
    - Of those, 29.3% were abused in the past 12 months.
    - Women were significantly more likely than men to have been abused (47.6% vs. 25.7%)
  - 43.6% of participants reported that they experienced depressive symptoms in the past week (defined as a Center for Epidemiologic Studies-Depression Index score  $\geq 16$ )



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- Women were significantly more likely than men to have depressive symptoms (48.9% vs. 36.3%).
- 52.7% of participants had ever been to jail, prison, or juvenile detention (lifetime) while 18.6% reported having been arrested by police and booked within the past 12 months.
- People are having sex with partners who have risk factors, too. These include believing their partners had ever:
  - been in jail or prison > 24 hours (44.3%)
  - used crack cocaine (26.0%)
  - injected drugs (7.0%).
  - 49.7% of participants did not know their last sex partner's HIV-status.

**→What does this mean?**

- *Poverty, early sexual debut, substance abuse, violence, depression, and interaction with corrections often go together with each other and with increases in HIV and other STD transmission.*
- *Interventions that address multiple needs and public health challenges are necessary—targeting them individual needs one at a time may not be as effective.*
- *Interventions to assist people to discuss their risk factors for HIV, including their sex partner's HIV status, may increase condom use within relationships as well as HIV testing. Social marketing materials that encourage testing as a couple and effective communication strategies may be of value.*

**✓ HIV prevention services in the District of Columbia are poorly utilized.**

- Only a small proportion of participants had exposure to HIV prevention activities:



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- 13.1% had experienced any one-on-one conversation about HIV prevention with an outreach worker, prevention program worker, or counselor about ways to protect against HIV and other STDs
- 9.4% had experienced any group-level intervention, an organized small group session regarding HIV prevention.

**→What does this mean?**

- *While excellent prevention services exist at multiple locations throughout the District of Columbia, they are not well used.*
- *Finding ways of encouraging access to and use of evidence-based prevention group or individual programs is needed.*

**Implications and recommendations**

- ✓ This study corroborates the elevated rates of HIV suggested by surveillance data in the recent District of Columbia HIV/AIDS, Epidemiology Annual Report (2007).
- ✓ These community-based data suggest that a generalized epidemic among heterosexuals at high risk for HIV based on poverty and location of social and sexual networks around them may be emerging in the capital of the United States, with black women at particular risk.
- ✓ This prevalence in a high risk sample described by NHBS is comparable to heterosexual epidemics in Africa described by population-based surveys: including 5.5% in Cameroon, 4.7% in Cote d'Ivoire, and 6.7% in Kenya. The DC prevalence is higher than estimates found in Rwanda (3.0%), Ethiopia (1.4%), Ghana (2.2%), and among the women is approaching those of Tanzania (7.0%) and Uganda (7.1%).
- ✓ Women in the District of Columbia are at increased risk of HIV, yet their risk behaviors do not always manifest as the traditional risk factors associated with acquisition of HIV, such as having large numbers of sex partners, or many casual or exchange partners. As has been found in other countries and in the Southern United States, the primary risk factor for local heterosexual women may be



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simply that they are engaging in sex within a network that has a high prevalence for HIV with partners at high risk for HIV.

- ✓ Condoms are not being used. Innovative approaches to teaching condom negotiation skills that are population-specific are rapidly needed.
- ✓ Use of condoms in partnerships that are perceived to be low risk, such as main or stable relationships, may be necessary given the high prevalence of HIV and partnership concurrency in the community. Creating an environment where condom use is consistent is a complicated undertaking, requiring substantive formative work to identify potential interventions, develop and evaluate them. Strategies should be gender-, age-, and risk factor-specific.
- ✓ Condom distribution may be an effective strategy and residents, particularly females, perceive that free condoms increase the likelihood of using condoms. However, rates of condom use and access to prevention services remain alarmingly low, suggesting the need for active intervention on a massive scale.
- ✓ There are substantial correlates that place residents at risk for HIV, including domestic physical and emotional abuse, depression, poverty, lack of healthcare access, and substance abuse. HIV prevention strategies need to incorporate the host of factors associated with HIV risk in the local environment, many which may also be gender-specific.
- ✓ HIV testing was not being routinely offered at the time of this study, and substantial missed opportunities for diagnosing HIV infection occurred, although Washington, DC's routine testing initiative may be associated with increased access to testing as well as the decision to test for HIV. Routine HIV testing should be offered to people engaging in healthcare in any setting, irrespective of traditional risk factors. Future NHBS data will allow an evaluation of trends in routine screening over time.
- ✓ Many people do not get HIV tested because they are afraid of finding out they are HIV-positive or do not believe themselves to be at risk for HIV. These individuals may be less likely to return for confirmatory testing or care, and



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interventions should be targeted to encourage the essential step of immediate linkage into care.

- ✓ Publicizing features of HIV testing may be an effective means to increase access to it. In particular, the availability of free tests and free testing sites, confidentiality regulations that prevent inadvertent disclosure of results, the rapidity of oral HIV testing and the needle-free testing through oral screening. Many individuals did not have an accurate impression of the procedures attendant upon HIV testing procedures locally, and these may be barriers to accessing this critical step in reducing the HIV epidemic in the District of Columbia.

## Conclusions

Future data collection years of NHBS will provide an opportunity to compare risk behaviors for HIV between risk populations, assessing the potential for heterosexual, MSM, and IDU-specific strategies. As NHBS is conducted each year in the District of Columbia, we will be able to evaluate trends in risk factors in the three different target populations, as well as in individual-level characteristics. This offers a critical opportunity for public health intervention in a region with the highest HIV and AIDS rates in the United States, as well as optimism that this information may be used effectively to rapidly implement innovative strategies to combat this *Modern Epidemic*.

## Frequently Asked Questions

### **Can these data be applied to all heterosexual people in Washington, DC?**

The sampling strategy used in NHBS-HET (RDS) allows us to apply the findings of this study sample to the population of social and sexual networks *similar to that which is was drawn*. That is, the majority of this sample was heterosexual, black, lived in designated high risk areas of the city, had income <\$10,000 a year, and had a high school degree or less. We *cannot* apply these findings to all District residents or to all heterosexuals. The study was only designed to look at individuals considered at high



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risk for HIV based on the CDC definition. The algorithm designed by CDC focused on individuals having a social or sexual connection to areas of high AIDS rates and high poverty. This means we cannot compare our findings to people in other areas of the city or other demographic groups because the study did not collect data on them.

**How were the raw data transformed so that they could be applied to the population of people similar to those in the sample?**

The sampling strategy used in NHBS-HET (RDS) allows the data to create individualized weights based on the characteristics of the people who refer each other into the study. Quantitative results provided in this report were analyzed using RDS Analytical Tool (RDSAT, Ithaca, NY) to weight for the RDS sampling strategy. There were no significant differences between the unweighted and weighted frequency estimates (using a significance threshold of  $\alpha=0.05$ ). Data are presented weighted in this report weighted for RDS. This means that we can apply the findings of this study sample to the population of social and sexual networks *similar to that from which it was drawn*

**I would like to know more about the details of how the study was implemented.**

Following a welcome to the WORD UP clinic and an introduction to the study by the field supervisor, potential participants were offered healthy refreshments and water while they waited in the WORD UP waiting room. Participants were seen by appointment or in the order of their arrival for walk-ins; they were escorted to the interview rooms and asked several brief questions to assess their eligibility for the study; these questions concerned age (participants had to be  $\geq 18$  and  $<$  the upper age limit of eligibility to participate), sexual behavior over the last 12 months, and other questions that are used by CDC to establish a uniform sample of people throughout the country. Individuals found to be ineligible were thanked, offered condoms and health promotion and risk reduction literature and, if needed, a bus token.



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For those who were eligible, the informed consent process was initiated. As per CDC recommendations and with IRB approval from both GWU and DC DOH/HAA, informed consent was conducted verbally only because the study is anonymous and any documentation of the participant's name or initials would pose a risk of inadvertent disclosure. A comprehensive informed consent script was read to the participant, highlighting the study procedures and voluntary nature of the study; participants were given a copy of the informed consent document.

For participants opting to take the HIV oral rapid screening test, a brief pre-test assessment was conducted, the oral test specimen provided, and the interview initiated. Questionnaire data were collected via face-to-face interview with extensively trained interviewers. Nearly all (98.2%) interviews were conducted in private and soundproof rooms in the study clinic at FMCS, while 16 (1.8%) were conducted on the FMCS mobile unit parked at a local shopping mall in Northeast DC. Participant responses to questions were entered directly into handheld computer devices by interviewers using Questionnaire Development System (QDS) version 2.4 software (Nova Research, Bethesda, MD). Spanish speaking participants were offered the option of having the questions asked in English or Spanish, and a fluent Spanish speaking interviewer was available at all times. Participants eligible to recruit were provided a brief "recruiter" training. All study participants were given the gift cheque incentive for completing the survey; recruiters were rewarded with additional gift cheque incentives for each network member they referred into the study who was eligible.

Upon completion of the interview, HIV test counseling was conducted in advance of return of HIV test results. Participants screening HIV positive were referred immediately for confirmatory testing and care at FMCS in the same building. Individuals who could not go to FMCS immediately were given a referral card and return appointment; WORD UP interviewers and field supervisor assessed participants to ensure adequate social support was immediately available and that they were in a stable mental state prior to leaving the clinic. Mental health and crisis management support were available during



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all clinic hours in the event of acute participant reaction to HIV screening result. Individuals screening HIV negative were counseled on risk reduction behavior, provided with health promotion literature and condoms, and thanked for their participation.

### **What is happening now with NHBS in Washington, DC?**

The WORD UP team has completed the NHBS-MSM for the 2008 data collection year with 500 MSM participating in local venues throughout the District. Stay tuned for release of data as soon as it becomes available.

### **How can I be involved?**

The WORD UP team is eager to engage the community in NHBS. If you are interested in speaking with the study team or being a member of the Community Advisory Board (CAB) please contact Dr. Manya Magnus at [sphmdm@gwumc.edu](mailto:sphmdm@gwumc.edu).

### **What are limitations of NHBS?**

There are several limitations to this study. As with most studies of sexual and other HIV-risk behavior, the majority of information is obtained via self-report. Participants may have difficulty recalling the requested information, or may underreport socially undesirable or over report socially desirable behaviors either consciously or subconsciously. As an interviewer-administered questionnaire, it is possible that there were inter- and/or intra-interviewer differences in the reading of the questions, as well as errors in recording. Extensive training was conducted as well as ongoing quality assurance and supervision to avoid this type of error; however, it does remain possible anytime information is obtained via survey techniques. Characteristics of participant partners (e.g., concurrency, drug use) are not confirmed by the partner in question, and must be interpreted cautiously.

The primary biomedical outcome was rapid oral HIV screening testing conducted using OraQuick test kits. In order to not bias the HIV testing outcome in favor of those who



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returned for confirmatory results or those who were known positives, preliminary test results were used. This differs from the CDC's strong recommendation to use only Western Blot results for analysis. Based on the parameter of the OraQuick test using oral rapid fluids we believe that the maximum expectation would be that no more than one false positive test among those who did not return for results could have occurred, and the use of the screening results is an adequate *estimate* of the true HIV prevalence in the sample. Still, without confirmatory results it is not possible to know the true underlying confirmed positive proportion, only the proportion *screening* HIV positive.

Use of RDS to generalize study findings to the population is complex. Under the assumptions of RDS, upon achievement of sufficient "waves" of chains of recruitment and under different levels homophily (i.e., how much mixing there is in any given network between people that are very similar ranging to people who are very different from oneself), one can generalize estimates from RDS collected data to the underlying population from which it is drawn. This is in contrast to a chain-referral system which does not use RDS, which may be systematically biased. The assumptions of RDS may or may not be achieved. For this study, it appears that those that are measurable were achieved; however, a true comparison of the underlying population estimates in comparison with sample estimates is not possible. Based on the use of RDS analytic tools and diagnostics, we believe that we can estimate population-based prevalences of primary outcomes and that there were very few significant differences between the weighted and unweighted prevalence estimates in the overall sample.

### **What are strengths of NHBS?**

This study offers the first evaluation of a community-based estimate of risk behaviors that put people at risk for HIV infection in the District of Columbia. Information gained through this study will be useful in developing future studies as well as interventions that can address some of the risks that are being taken locally. Strengths of this study include the use of RDS which, despite complexities described above, provides generalizable estimates of the variables being observed; collection of extensive



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behavioral information from a large, non-clinic or prevention organization-based sample from the community; use of rapid HIV screening to link behavioral data with clinical biomarkers; use of local prevention questions which allow evaluation of local issues such as the DC HIV testing initiative, condom distribution, use of local prevention services, as well as data collection on additional issues such as intimate partner violence and depression. Unlike clinic-based studies of people that tend to engage in prevention activities or healthcare utilization behavior, NHBS allows a greater understanding of what behaviors are putting people at the risk for HIV in our community as a whole. This less-biased estimate of such behaviors is a critical step towards understanding what public health professionals can do to halt HIV transmission in Washington, DC.

## **Abbreviations and Acronyms**

<b>AIDS:</b>	Acquired Immunodeficiency Syndrome
<b>CDC:</b>	United States Centers for Disease Control and Prevention
<b>CES-D:</b>	Center for Epidemiologic Studies-Depression screening tool
<b>DOH:</b>	District of Columbia Department of Health
<b>GWU:</b>	George Washington University
<b>HAA:</b>	HIV/AIDS Administration
<b>HAART:</b>	Highly Active Antiretroviral Therapy
<b>HIV:</b>	Human Immunodeficiency Virus
<b>IRB:</b>	Institutional Review Board
<b>IDU:</b>	Injection Drug User
<b>MSM:</b>	Men who have sex with men
<b>NHBS:</b>	National HIV Behavioral Surveillance
<b>NHBS-HET:</b>	National HIV Behavioral Surveillance, heterosexuals at risk of HIV data collection year
<b>NHBS-IDU:</b>	National HIV Behavioral Surveillance, IDU data collection year



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**NHBS-MSM:** National HIV Behavioral Surveillance, men who have sex with men data collection year

**RDS:** Respondent-driven sampling

**RNI:** Risk Not Identified

**STD:** Sexually Transmitted Disease

**SPHHS:** School of Public Health and Health Services

**VBS:** Venue-based sampling

**WORD UP:** Washington Outreach Research Drive to Understand Prevention; the local name of NHBS in Washington, DC, conducted by GWU SPHHS.

**What are other references I can look to about RDS, generalized epidemics, behavioral surveillance, or HIV among subpopulations?**

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**District of Columbia  
HIV/AIDS Behavioral Surveillance  
Technical Report  
2008**

A Public Health/Academic Partnership between the

District of Columbia Department of Health  
and  
The George Washington University School of  
Public Health and Health Services  
Department of Epidemiology and Biostatistics

Contract Number POHC-2006-C-0030



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**District of Columbia  
Summary HIV/AIDS  
Behavioral Surveillance Report  
2008**

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## Executive Summary

Washington, DC, has the highest HIV/AIDS rate in the United States, yet surprisingly little is known about the sexual behaviors people engage in before they become infected. In addition, we know very little about other HIV-related risk behaviors, HIV testing behaviors, and access to prevention services among people who are not already in care. The most recent District of Columbia, HIV/AIDS, Epidemiology Annual Report (2007) characterizes the “Modern Epidemic” in Washington, DC, based on surveillance data:

- ✓ Washington, DC has the highest HIV/AIDS case rate nationally (128.4 cases per 100,000 population compared to 14.0 cases per 100,000 population in the US).
- ✓ Washington, DC’s newly reported AIDS cases is higher than rates found in similarly sized cities Baltimore, Philadelphia, New York City, Detroit, and Chicago.
- ✓ Heterosexual contact leads new transmissions (~37% of newly reported infections).
- ✓ Heterosexual contact was most common mode of acquisition of HIV (61%) for women; in addition, 23% of new HIV cases were among women with no identified risk.
- ✓ Black women constitute only 58% of the District’s female population, but they account for 90% of all new female HIV cases and 93% of living AIDS cases among women.
- ✓ Although black residents account for only 57% of the District’s population, they account for 81% of new reports of HIV cases and approximately 86% of living AIDS cases.

HIV and AIDS surveillance data suggest that alongside concentrated epidemics among men who have sex with men (MSM) and injecting drug users (IDU), a generalized epidemic may be emerging among heterosexuals at high risk of HIV/AIDS in the District of Columbia. UNAIDS/WHO defines generalized HIV epidemics as those where more than 1% of the adult (ages 15 to 59 years) population is HIV-positive. Up to now, the United States has been in the category of concentrated epidemics, where HIV prevalence is elevated in specific high-risk populations, MSM and IDU. But the estimated prevalence of HIV/AIDS that surveillance data suggest, ranging from 3% to 5%, is not dissimilar to those found among heterosexual epidemics around the world. With heterosexual transmission on the rise and black women at increased risk, we need to find ways to halt the emerging generalized epidemic among heterosexuals in the District of Columbia.

Certain sexual risk behaviors have been identified in studies of other generalized, heterosexual epidemics in developing countries, as well as among black heterosexual women in the rural Southern United States. These include:

- ✓ Substantial poverty
- ✓ Early sexual debut



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- ✓ Concurrency (having more than one sexual partner at a time)
- ✓ Multiple sexual partners
- ✓ Lack Of condom use
- ✓ Substance abuse
- ✓ Depression
- ✓ Fewer men being circumcised.

How each of these affects the epidemic can depend on the characteristics of the epidemic: how long it has been in the area, how many people are already HIV-positive, how quickly the virus is being transmitted, and other factors. These factors in turn may drive generalized epidemics in places with early and established HIV epidemics, not only in immature epidemics as had been thought early on. This means that it may not be too late to slow the epidemic if we can understand HIV risk behavior and work together to change it. Understanding risk behavior in the District will help us create and adapt innovative prevention strategies.

## Summary of Methods

NHBS is a CDC-funded project conducted in 25 cities throughout the United States. The purpose of NHBS is to learn about what people do that puts them at risk for HIV. NHBS has three target populations to learn about different risk behaviors: men who have sex with men (NHBS-MSM), injecting drug users (NHBS-IDU), and heterosexuals at risk of HIV infection (NHBS-HET). Data are collected on each population for one year, and then the three-year cycle begins again. This study is a serial cross-sectional design and provides a comparison between years and between populations on the HIV-related risk behavior characteristics of interest. A key feature of NHBS is that it is population-based: this allows a deeper understanding of behavior occurring in the community, and not just among persons with HIV or those who seek healthcare or prevention services.

Population-based estimates of behavior and access to care are better able to inform our understanding of local community members' needs than samples of individuals seeking care at clinics or hospitals. Although the populations change annually and two alternate methods of sampling are used to identify participants at random, the questionnaire and basic study implementation remains the same from year to year.

NHBS is conducted by the George Washington University School of Public Health and Health Services (GWU) Department of Epidemiology and Biostatistics through the Public Health/Academic Partnership with the DC Department of Health/HIV-AIDS Administration (DC DOH/HAA). This study is known locally as the WORD UP Study (Washington Outreach Research Drive to Understand Prevention). All protocol activities are governed by a multi-site protocol developed and overseen by the CDC, approved jointly by the DC DOH and GWU Institutional Review Boards (IRB), and with the guidance of the WORD UP Community Advisory Board (CAB).

The data described in this report are derived from the 2006-2007 data collection year for Heterosexuals at High Risk for HIV (NHBS-HET-1). Briefly, the methodology to conduct



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the study was as follows: Following a period of intensive geospatial, quantitative, qualitative, and ethnographic formative work, recruitment into the quantitative behavioral cross-sectional study was initiated in December 2006. Based on the formative data, Family and Medical Counseling Service, Inc. was identified as an appropriate setting for the study's fixed site; through a partnership developed between GWU and FMCS, the study clinic was established in the building on a separate floor, to ensure rapid referral into clinical care for those who screened HIV-positive. If eligible for the study, participants were given a 30 to 40 minute anonymous survey and, if they wished, an anonymous rapid oral HIV screening test. The survey asked about sexual, drug use, and health-seeking behaviors, including HIV testing and utilization of HIV prevention and treatment services. Individuals who were not eligible for the study but who wished to get an HIV test were given information about where they could get a free test. Anyone who screened or was confirmed positive for HIV was immediately linked into care. Participants were recruited through a process known as respondent-driven sampling (RDS). In this method, several non-randomly selected individuals called "seeds" referred three people from their social and/or sexual network to participate in the study. The individuals referred by the seeds who completed the interview are called "non-seeds", and eligible non-seeds were also asked to refer up to three people in their social/sexual networks, who would in turn refer other non-seeds to the study. This referral process continued until the final sample size of 750 eligible (non-injection drug user) non-seeds was met. Spouses, relatives or sexual partners, co-workers or others they knew could be referred. Nominal incentives were provided for individuals completing the interview, taking the HIV test, and, where applicable, referring eligible participants from their networks. Once the required sample size was achieved and other statistical assumptions were met, these "referral chains" provided a generalizable sample of heterosexuals at risk for HIV infection in Washington, DC. In order to generalize the information from the study sample to the larger population of heterosexuals at high risk in DC, sampling weights were generated for each variable using a specialized RDS software and were used to calculate the "weighted" (i.e., population-based) prevalence rates for each of the variables. This means that we may use the information gained from NHBS-HET to better understand the population of individuals similar to participants, not just the participants themselves.

Planning and formative research was conducted and completed in the fall of 2006. Survey collection began in December 2006 and was completed by October 31, 2007. Information gained from NHBS will guide HIV prevention and counseling, testing, and referral services in Washington, D.C. It will also help guide and improve overall HIV/AIDS surveillance, the development of targeted prevention interventions, and provide a better understanding of trends and transmission dynamics of HIV in this high risk group in the District of Columbia.

### **Summary of findings:**

- As of the closure date, the WORD UP team had exceeded the accrual expectation of N=750 non-current IDU (no injecting drug use in past 12 months).



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In total, there were 1,144 interviewees screened, 3.3% were non-randomly selected seed participants. Of those non-seed participants screened, 915 (82.7%) were eligible, of whom 910 (99.5%) completed the interview. Of those, 785 (86.3%) did not report IDU in the past 12 months and were considered non-current IDU. Of those, 750 (95.5%) had complete data available for analysis. Almost half (41.1%) of the ineligible participants were ineligible due to being over or under the eligible age range; 38.3% did not report sexual activity with a person of the opposite sex in the past 12 months. Analyses were conducted on the N=750 non-current-IDU participants on whom complete data were available, consistent with the CDC definition of non-current IDU.

- The majority of participants was over 30 (61.4%), Black (92.3%), never been married (61.6%), and reported a heterosexual orientation (89.5%). More than a third (37.6%) had less than a high school degree, and the majority had attained a high school degree or less (85.7%). More than a third (43.7%) of the participants was unemployed, 60.0% reported an annual household income of less than \$9,999, and 21.8% had ever been homeless (with 13.9% being currently homeless). Nearly a fifth (18.7%) of participants had no health insurance. Of the participants with health insurance, 91.8% were insured by Medicaid or Medicare. More than half (52.7%) of the participants had ever been to jail, prison, or juvenile detention (lifetime) while 18.6% reported having been arrested by police and booked within the past 12 months.
- Based on anonymous NHBS HIV screening results, 5.2% (95% CI 2.9% - 7.2%) tested as preliminary positive. Initially positive individuals who subsequently were confirmed by Western Blot (WB) as HIV-negative were reclassified as HIV-negative. Nearly half (47.4%, 95% CI 30.9% - 78.7%) of those screened HIV-positive did not know their HIV status prior to taking the NHBS HIV test.
  - The elevated rates of HIV suggested by surveillance data in the recent District of Columbia HIV/AIDS, Epidemiology Annual Report (2007) have been corroborated in this population-based sample. A 5.2% estimated HIV prevalence among non-current injecting drug users, with 6.3% among women is comparable to epidemics in various countries in sub-Saharan Africa described by population based surveys ([http://data.unaids.org/pub/EPISlides/2007/2007\\_epiupdate\\_en.pdf](http://data.unaids.org/pub/EPISlides/2007/2007_epiupdate_en.pdf); accessed 4/20/08). For example, Cameroon 5.5%, Cote d'Ivoire 4.7%, or Kenya 6.7%. It is higher than estimates found in Rwanda 3.0%, Ethiopia 1.4%, Ghana 2.2%, and approaching those of Tanzania 7.0% and Uganda 7.1%. This prevalence in a community-based samples echoes that found in the surveillance and suggests the emergence of a generalized HIV epidemic among heterosexuals at high risk for HIV as defined by the study criteria in Washington, DC.



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- The majority of the sample had never injected drugs (85.9%); 14.1% had injected drugs in their lifetimes, but not in the 12 months prior to the interview. More than two-thirds (60.2%) had used non-injection drugs in the past 12 months.
- Nearly half (43.6%) reported experiencing depressive symptoms in the past week, with Center for Epidemiologic Studies-Depression scale scores higher than the cutpoint of  $\geq 16$ . There was substantial domestic violence, with 37.9% reporting having ever been emotionally or physically abused, and of those, 29.3% in the past 12 months.
- The majority of participants had their sexual debut at 16 years or younger (69.2%) with 23.1% 13 and younger. More than half of the participants (57.9%) reported having  $\geq 2$  sexual partners in the past 12 months. The majority of most recent sex partners were main partners (74.2%); the remainder were casual (18.9%) and exchange (7.0%) partners.
- At last sex, 98.5% reported having vaginal sex and 7.6% reported having anal sex, of which 71.2% and 100.0% respectively, were unprotected acts. Of those who attempted to use a condom during vaginal sex, in 5.7% the condom was not used the whole time. When condoms were used, participants reported using them for pregnancy prevention (6.4%), STD prevention (6.6%), and both (86.4%). In nearly half (48.9%) of the last sexual interactions drugs and/or alcohol were used (9.5% drugs, 23.1% alcohol, 16.3% drugs and alcohol). Although it is not a behavior, in view of its status as a correlate of HIV transmission, the proportion of males who reported being circumcised was 56.2%.
- Participants believed their last sex partners had engaged in risk behaviors in varying frequencies: they believed they had ever injected drugs (7.0%), used crack cocaine (26.0%), and had ever been in jail/prison >24 hours (44.3%). Almost half of the partners were older than the respondent (44.7%). In estimating partner fidelity to the sexual relationship, 45.9% believed their last sexual partner definitely or probably had sex with someone else during the past 12 months of the relationship, while 44.9% reported that they themselves had sex with someone else during the past 12 months of the relationship. Nearly half (49.7%) of the participants did not know their last sex partner's HIV status; of those who did, 4.3% were believed to be HIV-positive.
- The majority (87.9%) had tested for HIV at least once in their lives, with 76.0% of those reporting being tested in the past 24 months and 60.9% in the past 12 months. Few (3.5%) reported their last HIV test was positive, while 6.0% did not *return* for the result of their last HIV test. Testing modality at last HIV test was similar between oral tests (41.1%) and blood tests (phlebotomy) (52.3%), with many fewer via fingerstick (6.5%).



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- The most common locations for HIV testing at last HIV test were Community health center/public health clinic (26.2%), HIV/AIDS street outreach/mobile unit (12.0%), and correctional facility (11.1%); 65.6% of the most recent tests were confidential (versus anonymous) testing. Nearly a third (31.4%) had heard about the Washington, DC, HIV testing initiative and, of those, 64.1% reported that the initiative “made them want to get HIV tested.”
- A majority of participants (79.7%) had seen a healthcare provider in the past 12 months; of these, nearly half (49.4%) were not offered an HIV test. Of those participants who tested preliminary positive and did not know their status previous to study participation, 72.7% (unweighted) had seen a healthcare provider in the past 12 months; of those persons newly diagnosed with HIV who did not previously know their status, 50% (n=8/16) had not been offered an HIV test.
- Participants were allowed to select multiple reasons for not having had an HIV test in the past 12 months. Of those who were not tested, the most common responses included being afraid of having HIV (39.7%), not liking needles (33.8%), not having time (23.9%), being worried someone would find out about their test result (28.6%), the perception that they are at low risk for HIV (22.8%), and being afraid of losing family/friends (18.8%). Additionally, there were practical and knowledge deficit reasons for non-testing in the last 12 months, including not having money or insurance for testing (25.7%), worry that name would be reported to the government (19.5%), not knowing where to get tested (17.7%), afraid of loss of job, and insurance, or housing (13.1%), lack of transportation (11.5%).
- More than half (52.3%) of the participants indicated that they had received free condoms in the past 12 months; of those, 59.5% reported using the free condoms, and 77.3% felt that getting the free condoms made them more likely to use condoms. Only a small proportion of participants had exposure to HIV prevention activities: 13.1% had experienced any one-on-one conversation about HIV prevention with an outreach worker, prevention program worker, or counselor about ways to protect against HIV and other STDs, and only 9.4% had experienced any group-level intervention, an organized small group session regarding HIV prevention.

In view of the increasing rate of HIV-infection among African American women in the District of Columbia, gender-differences in participant characteristics, sexual and drug use behaviors, and HIV testing were explored.

- Women were more likely than men to screen HIV positive through study-related testing (6.3% vs. 3.9%) in the weighted population estimates. Unweighted



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estimates did not differ significantly between men and women (4.99% vs. 4.39%,  $p=0.712$ ). Of those diagnosed with HIV, 69.2% ( $n=9$ ) of men and 57.1% ( $n=12$ ) of women were new positives who did not know their status prior to participating in NHBS.

- Males and females differed significantly in several domains. Women were more likely than men to be bisexual (12.9% vs. 3.7%,  $p<0.001$ ), high school graduate/GED recipient or higher (64.3% vs. 58.9%,  $p<0.05$ ), and earn less than \$9,999 annually (65.3% vs. 53.1%,  $p<0.01$ ). Women were less likely to lack health insurance (11.0% vs. 30.7%,  $p<0.001$ ) and to have ever been in jail, prison, or juvenile detention (36.8% vs. 76.2%,  $p<0.001$ ) than men, as well as less likely to have been arrested by police and booked than men (13.4% vs. 26.5%,  $p<0.001$ ).
- Women were less likely than men to have sexual debut at age 13 or younger (16.7% vs. 40.3%,  $p<0.001$ ) and more likely to have only one sex partner in the past 12 months (46.4% vs. 34.8%,  $p<0.01$ ), and more likely to have had a main partner as a last sex partner (78.3% vs. 67.9%,  $p<0.05$ ). Women were less likely than men to report use of either alcohol and/or drugs together at last sex (14.3% vs. 19.4%, respectively,  $p<0.05$ ).
- Women were more likely to have never injected drugs than men (90.1% vs. 80.1%,  $p<0.05$ ), but did not differ with respect to use of non-injection drugs in the past 12 months. Women were more likely than men to have depressive symptoms (48.9% vs. 36.3%,  $p<0.001$ ), to ever have been emotionally or physically abused (47.6% vs. 25.7%,  $p<0.001$ ). Condom use was similar among women and men, with 71.1% in both groups reporting no condom use at last vaginal sex.
- Sexual and drug use characteristics were similar between men and women with regard to partner drug use, perception of partner fidelity over the past 12 months, and knowledge of partner's HIV status. However, women were more likely than men to have had a partner with a history of being in jail or prison (58.1% vs. 22.7%,  $p<0.001$ ), have an older sexual partner (55.4% vs. 27.7%,  $p<0.001$ ), and women were less likely than men to report having had a concurrent sexual partnership in the past 12 months (40.3% vs. 53.0%,  $p<0.05$ ). For both men and women, nearly half (49.5% and 49.9%, respectively) did not know their most recent sex partner's HIV status.
- Men were more likely than women to have had previous oral HIV testing (47.6% vs. 36.3%,  $p<0.05$ ) than blood testing. Men were more likely than women to use free condoms if they got them (63.7% vs. 56.4%,  $p<0.05$ ) but women were more likely than men to perceive that getting free condoms made him or her more likely to use them (86.2% vs. 63.0%,  $p<0.001$ ). Relatively few men and women



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had participated in any individual-level (13.5% and 13.2%, respectively), but women were more likely to have been exposed to group-level prevention interventions than men (10.3% and 7.5%,  $p<0.001$ ). Women were significantly more likely to have seen a doctor, nurse, or other healthcare provider in the past 12 months than men (87.4% vs. 67.0%,  $p<0.01$ ); men were less likely to be offered an HIV test at any of those visits than women (44.6% vs. 53.3%,  $p<0.05$ ).

## Conclusion and recommendations

The findings of this study suggest several recommendations regarding the development and implementation of prevention strategies specific to the District of Columbia:

- ✓ This study corroborates the elevated rates of HIV suggested by surveillance data in the recent District of Columbia HIV/AIDS, Epidemiology Annual Report (2007).
- ✓ These community-based data suggest that a generalized epidemic among heterosexuals at high risk for HIV based on poverty and location of social and sexual networks around them may be emerging in the capital of the United States, with black women at particular risk.
- ✓ This prevalence in a high risk sample described by NHBS is comparable to heterosexual epidemics in Africa described by population-based surveys: including 5.5% in Cameroon, 4.7% in Cote d'Ivoire, and 6.7% in Kenya. The DC prevalence is higher than estimates found in Rwanda (3.0%), Ethiopia (1.4%), Ghana (2.2%), and among the women is approaching those of Tanzania (7.0%) and Uganda (7.1%).
- ✓ Women in the District of Columbia are at increased risk of HIV, yet their risk behaviors do not always manifest as the traditional risk factors associated with acquisition of HIV, such as having large numbers of sex partners, or many casual or exchange partners. As has been found in other countries and in the Southern United States, the primary risk factor for local heterosexual women may be simply that they are engaging in sex within a network that has a high prevalence for HIV with partners at high risk for HIV.
- ✓ Condoms are not being used. Innovative approaches to teaching condom negotiation skills that are population-specific are rapidly needed.
- ✓ Use of condoms in partnerships that are perceived to be low risk, such as main or stable relationships, may be necessary given the high prevalence of HIV and partnership concurrency in the community. Creating an environment where condom use is consistent is a complicated undertaking, requiring substantive formative work to identify potential interventions, develop and evaluate them. Strategies should be gender-, age-, and risk factor-specific.
- ✓ Condom distribution may be an effective strategy and residents, particularly females, perceive that free condoms increase the likelihood of using condoms. However, rates of condom use and access to prevention services remain alarmingly low, suggesting the need for active intervention on a massive scale.
- ✓ There are substantial correlates that place residents at risk for HIV, including domestic physical and emotional abuse, depression, poverty, lack of healthcare



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access, and substance abuse. HIV prevention strategies need to incorporate the host of factors associated with HIV risk in the local environment, many which may also be gender-specific.

- ✓ HIV testing was not being routinely offered at the time of this study, and substantial missed opportunities for diagnosing HIV infection occurred, although Washington, DC's routine testing initiative may be associated with increased access to testing as well as the decision to test for HIV. Routine HIV testing should be offered to people engaging in healthcare in any setting, irrespective of traditional risk factors. Future NHBS data will allow an evaluation of trends in routine screening over time.
- ✓ Many people do not get HIV tested because they are afraid of finding out they are HIV-positive or do not believe themselves to be at risk for HIV. These individuals may be less likely to return for confirmatory testing or care, and interventions should be targeted to encourage the essential step of immediate linkage into care.
- ✓ Publicizing features of HIV testing may be an effective means to increase access to it. In particular, the availability of free tests and free testing sites, confidentiality regulations that prevent inadvertent disclosure of results, the rapidity of oral HIV testing and the needle-free testing through oral screening. Many individuals did not have an accurate impression of the procedures attendant upon HIV testing procedures locally, and these may be barriers to accessing this critical step in reducing the HIV epidemic in the District of Columbia.

Future data collection years of NHBS will provide an opportunity to compare risk behaviors for HIV between risk populations, assessing the potential for heterosexual, MSM, and IDU-specific strategies. As NHBS becomes routinized in the District of Columbia, we will be able to evaluate secular trends in risk factors by population as well as other individual-level characteristics. This offers a critical opportunity for public health intervention in a region with the highest HIV and AIDS rates in the United States, as well as optimism that this information may be used effectively to rapidly implement innovative strategies to combat this modern epidemic.



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## Background

Washington, DC, has the highest AIDS rate in the US, yet little is known about the relationship between sexual behaviors, HIV testing behaviors, and access to prevention services in the general population. The most recent District of Columbia, HIV/AIDS, Epidemiology Annual Report (2007) characterizes the “Modern Epidemic” in Washington, DC from surveillance data:

- ✓ Washington, DC has the highest HIV/AIDS case rate nationally (128.4 cases per 100,000 population compared to 14.0 cases per 100,000 population in the US).
- ✓ Washington, DC’s newly reported AIDS cases is higher than rates found in similarly sized cities Baltimore, Philadelphia, New York City, Detroit, and Chicago.
- ✓ Although black residents account for only 57% of the District’s population, they account for 81% of new reports of HIV cases and approximately 86% of living AIDS cases.
- ✓ Black women constitute only 58% of the District’s female population, but they account for 90% of all new female HIV cases and 93% of living AIDS cases among women.
- ✓ Heterosexual contact leads new transmissions (~37% of newly reported infections).
- ✓ Heterosexual contact was most common mode of acquisition of HIV (61%) for women; in addition, 23% of new HIV cases were among women with no identified risk.

However, surveillance data only provide information about those people who enter the care system, are tested for HIV, and/or develop AIDS. It cannot inform us about the prevalence of HIV, or HIV-related risk factors, in the non-care seeking population. In the absence of population-based knowledge about risk and HIV testing behaviors, it is difficult to develop effective risk reduction strategies for local implementation. A greater understanding of the behaviors in which individuals in the Washington, DC, metropolitan area are engaging, and access to and perception of HIV testing and prevention services, is a critical step towards reducing the burden of disease in the District of Columbia.

## What is NHBS-HET?

NHBS is a CDC-funded project conducted in 25 cities throughout the United States. The purpose of NHBS is to learn about what people do that puts them at risk for HIV. NHBS has three target populations to learn about different risk behaviors: men who have sex with men (NHBS-MSM), injecting drug users (NHBS-IDU), and heterosexuals at risk of HIV infection (NHBS-HET). Data are collected on each population for one year each, and then the three-year cycle begins again. This study is a serial cross-sectional design and provides a comparison between years and between populations on the HIV-related risk behavior characteristics of interest. A key feature of NHBS is that it is population-



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based: this allows a deeper understanding of behavior occurring in the community, and not just among persons with HIV or those who seek healthcare or prevention services. Population-based estimates of behavior and access to care are better able to inform our understanding of local community member needs than samples of individuals seeking care at clinics or hospitals. Although the populations change annually and two alternate methods of sampling are used to identify participants at random, the questionnaire and basic study implementation remains the same from year to year.

## Summary of Methods

NHBS is conducted by the George Washington University School of Public Health and Health Services (GWU) Department of Epidemiology and Biostatistics through the Public Health/Academic Partnership with the DC Department of Health/HIV-AIDS Administration (DC DOH/HAA). This study is known locally as the WORD UP Study (Washington Outreach Research Drive to Understand Prevention). All protocol activities are governed by a multi-site protocol developed and overseen by the CDC, approved jointly by the DC DOH and GWU Institutional Review Boards (IRB), and with the guidance of the WORD UP Community Advisory Board (CAB).

The data described in this report are derived from the 2006-2007 data collection year for Heterosexuals at High Risk for HIV (NHBS-HET). Briefly, the methodology to conduct the study was as follows: Following a period of intensive geospatial, quantitative, qualitative, and ethnographic formative work, recruitment into the quantitative behavioral cross-sectional study was initiated in December 2006. Based on the formative data, Family and Medical Counseling Service, Inc. was identified as an appropriate setting for the study's fixed site; through a partnership developed between GWU and FMCS, the study clinic was established on a separate floor in their building, to ensure rapid referral into clinical care for those who screened HIV-positive. If eligible for the study, participants were administered a 30 to 40 minute anonymous survey and, if they wished, an anonymous rapid oral HIV screening test. The survey asked about sexual, drug use, and health-seeking behaviors, including HIV testing and utilization of HIV prevention and treatment services. Individuals who were not eligible for the study but who wished to get an HIV test were given information about where they could get a free test. Anyone who screened or was confirmed positive for HIV was immediately linked into care.

Participants were recruited through a process known as respondent-driven sampling (RDS). In this method, several non-randomly selected individuals called "seeds" referred three people from their social and/or sexual network to participate in the study. The individuals referred by the seeds who completed the interview are called "non-seeds", and eligible non-seeds were also asked to refer up to three people in their social/sexual networks, who would in turn refer other non-seeds to the study. This referral process continued until the final sample size of 750 eligible (non-injection drug user) non-seeds was met. Spouses, relatives or sexual partners, co-workers or others they knew could be referred. Nominal incentives were provided for individuals completing the interview,



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taking the HIV test, and, where applicable, referring eligible participants from their networks. Once the required sample size was achieved and other statistical assumptions were met, these “referral chains” provided a generalizable sample of heterosexuals at risk for HIV infection in Washington, DC. In order to generalize the information from the study sample to the larger population of heterosexuals at high risk in DC, sampling weights were generated for each variable using a specialized RDS software and were used to calculate the “weighted” (i.e., population-based) prevalence rates for each of the variables. This means that we may use the information gained from NHBS-HET to better understand the population of those in Washington, DC, similar to participants, not just the participants themselves. Planning and formative research was conducted and completed in the fall of 2006. Survey collection began in December 2006 and was completed by October 31, 2007. Information gained from NHBS will guide HIV prevention and counseling, testing, and referral services in Washington, D.C. It will also help guide and improve overall HIV/AIDS surveillance, and provide a better understanding of trends in HIV infection in the District of Columbia.

### ***Detailed description of methods***

The **formative phase** of the study consisted of several components:

**Secondary data review**—The secondary data review involved an assessment of existing local data regarding HIV and heterosexual populations. This included local research studies, data from nationally representative samples that include the District of Columbia, and local HIV/AIDS surveillance data.

**Mapping**—Following the CDC’s protocol, poverty and population data obtained from the 2000 census were linked with cleaned AIDS cases provided by DC DOH/HAA to generate an “index” score for each census tract in the District. The census tract index scores were then utilized to generate a map indicating areas deemed to be at high risk for HIV, labeled for research purposes high risk areas (HRAs); this geospatial information was used to establish the recruiter eligibility for the study. Eight “target” HRAs (HRAs with the highest index scores), were identified and were used to recruit non-randomly-selected seeds to initiate the recruitment chains for RDS.

**Qualitative studies and ethnography**—Key informant interviews, focus groups, and ethnography were conducted by a doctoral-level ethnographer. The primary goal of this data collection effort was to identify community-acceptable study procedures, clinic location, hours and methods of operation, logo/branding, pilot local questions, characterize local HIV-related attitudes, knowledge, and perceptions, build community support for the study, link secondary data review and mapping analysis to current geography and communities at risk taking into account factors such as gentrification, and assess study feasibility and safety.

Observations within the HRAs involved a number of activities which elicited information, confirmed, refuted and explained existing information from the secondary data analysis



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and provided an “on the ground” portrayal of the behaviors and patterns of the people who live and spend time within the HRAs. Observations were conducted to obtain qualitative and ethnographic knowledge of the people and environment within each geographical area. The purpose for the various data collection activities was to obtain multiple perspectives about life in these areas, the people who live there and their networks. We selectively used the data obtained from these sources and activities to inform subsequent, more focused observations in these areas. The aforementioned activities provided opportunities to obtain specific and descriptive information about the HRAs.

Field observations included windshield and walking tours of the HRAs and attendance at Advisory Neighborhood Commission meetings within the target HRAs. After identification of the target HRAs, ethnographic observations were focused more in the target HRAs to aid in seed identification. Focus groups were conducted with male and female residents of Washington, DC, who approximated the study selection criteria. Focus group participants were recruited through distributing flyers throughout the targeted areas and contacting community-based organizations located or connected to the areas. The focus groups were held at local community-based organizations within the target HRAs, or within the HRA universe if a site in the target HRAs was not available. Eligible participants for the focus group were between 18 and 50 years old, offered informed consent and signed the IRB-approved form, and able to participate in the group discussion. The information obtained during the focus group discussions provided a general sense of individuals who could possibly serve as seeds for the overall study. The focus group participants also provided their perspectives about relevant logistics and nuances specific to the recruitment and study implementation of the NHBS-HET in Washington DC. (e.g. participating in HIV testing, referral strategies, co-location site, etc).

Key informant interviews were also conducted, with key informants selected and interviewed based on results from analysis of data obtained from the preceding efforts such as field observations, focus group interviews and staff with extensive knowledge of the city. Key informants were individuals with understanding, knowledge and or potential influence on the sociopolitical environment that shapes the perspective about HIV in Washington, DC in general and the HRAs specifically. The purpose of the interviews was to elicit information relevant to accessing networks and gaining knowledge of social and sexual network activities in the target HRAs. This included but was not limited to key individuals who live and work in the target HRAs, important places, and participation with programs where people socialize and spend their time. Data obtained from the key informant interviews were used to screen, identify and select the initial seeds within the target HRAs as directed by CDC protocol.

Information derived from the combination of the mapping, qualitative, and ethnographic studies were the foundation for seed selection. Again, seeds were the non-randomly selected initial study participants who are “hubs” of social and/or sexual networks, who understand and wish to participate in the study. These seeds then participated in the



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quantitative study and referred three individuals each from their social networks. Seeds were not counted in the ultimate sample size, as they were selected non-randomly in accordance with a seed-selection protocol.

**Community support building**—Ensuring community acceptability and support of NHBS in the District was a primary goal. Study staff met with local community-based organizations, the Prevention Community Planning Group (CPG), DC DOH/HAA staff, community leaders, and community members to assess potential barriers for study implementation and ways to facilitate community rapport and acceptability. The WORD UP Community Advisory Board (CAB) was formed to further this goal and will remain a critical collaborator in all future NHBS cycles as a liaison between WORD UP and the community.

Information resulting from the formative phase was synthesized and incorporated into all aspects of the quantitative survey methods and procedures. GWU and DC DOH IRBs and CDC approved local plans for quantitative survey implementation based on the formative phase. Pilot activities were then undertaken and assessed for feasibility and acceptability prior to implementation of the quantitative survey.

The **quantitative phase** was launched in December 2006. The quantitative survey was conducted as follows:

Following a welcome to the WORD UP clinic at FMCS and an introduction to the study by the field supervisor, potential participants were offered healthy refreshments and water while they waited in the WORD UP waiting room. Participants were seen by appointment or in the order of their arrival for walk-ins; they were escorted to the interview rooms and asked several brief questions to assess their eligibility for the study; these questions concerned age (participants had to be  $\geq 18$  and  $<$  the upper age limit of eligibility to participate), sexual behavior over the last 12 months, and other questions that are used by CDC to establish a uniform sample of people throughout the country. Individuals found to be ineligible were thanked, offered condoms and health promotion and risk reduction literature and, if needed, a bus token.

For those who were eligible, the informed consent process was initiated. As per CDC recommendations and with IRB approval from both GWU and DC DOH/HAA, informed consent was conducted verbally only because the study is anonymous and any documentation of the participant's name or initials would pose a risk of inadvertent disclosure. A comprehensive informed consent script was read to the participant, highlighting the study procedures and voluntary nature of the study; participants were given a copy of the informed consent document.

For participants opting to take the HIV oral rapid screening test, a brief pre-test assessment was conducted, the oral test specimen provided, and the interview initiated. Questionnaire data were collected via face-to-face interview with extensively trained interviewers. Nearly all (98.2%) interviews were conducted in private and soundproof



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rooms in the study clinic at FMCS, while 16 (1.8%) were conducted on the FMCS mobile unit parked at a local shopping mall in Northeast DC. Participant responses to questions were entered directly into handheld computer devices by interviewers using Questionnaire Development System (QDS) version 2.4 software (Nova Research, Bethesda, MD). Spanish speaking participants were offered the option of having the questions asked in English or Spanish, and a fluent Spanish speaking interviewer was available at all times. Participants eligible to recruit were provided a brief “recruiter” training. All study participants were given the gift cheque incentive for completing the survey; recruiters were rewarded with additional gift cheque incentives for each network member they referred into the study who was eligible.

Upon completion of the interview, HIV test counseling was conducted in advance of return of HIV test results. Participants screening HIV positive were referred immediately for confirmatory testing and care at FMCS in the same building. Individuals who could not go to FMCS immediately were given a referral card and return appointment; WORD UP interviewers and field supervisor assessed participants to ensure adequate social support was immediately available and that they were in a stable mental state prior to leaving the clinic. Mental health and crisis management support were available during all clinic hours in the event of acute participant reaction to HIV screening result. Individuals screening HIV negative were counseled on risk reduction behavior, provided with health promotion literature and condoms, and thanked for their participation.

### ***Statistical methods***

Quantitative results provided in this report were analyzed using Stata version 9.1 (College Station, TX) and validated in SAS version 9.2 (Cary, NC). Individualized weights were exported from RDS Analytical Tool (RDSAT, Ithaca, NY) to weight for the RDS sampling strategy. Where applicable, RDS-weighted and –unweighted estimates are both presented; significant differences between the estimates (using a significance threshold of  $\alpha=0.05$ ) are highlighted. Data are presented weighted and unweighted for RDS, as well as weighted and stratified by gender in order to better understand gender differences which may be associated with the increase in heterosexual transmission locally.

## **Results**

### ***Formative Phase***

A comprehensive formative phase assessment report was submitted to CDC and DC DOH/HAA. The following is a summary of findings from that report.

#### **1. Secondary data review**



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The NHBS-HET secondary data review was finalized prior to the release (2007) of the updated District of Columbia HIV/AIDS Epidemiology Annual Report (<http://www.doh.dc.gov/doh/cwp/view,A,1371,Q,603431.asp>), which provides an up-to-date profile of HIV/AIDS in Washington, DC. Readers of this document are encouraged to read the Report as it describes the state of HIV/AIDS in the District of Columbia. The NHBS-HET secondary data review foreshadowed the Report's epidemiologic findings in its conclusion that the rate of heterosexual transmission has increased in the past decade. The data also suggested that over time, a larger proportion of African Americans than whites and other races is affected by the epidemic, above and beyond the demographic composition of the District.

Although some research has been conducted among several potential high risk groups for heterosexual transmission of HIV (i.e., young adults, African American men and women and Hispanic/Latino men and women), little systematic, population-based research has been done to adequately track the HIV epidemic in the District; NHBS offers a vital opportunity to better understand local risk behaviors and community risks and suggest prevention approaches in what appears to be an increasingly generalized epidemic. Exposure to risk behavior in correctional facilities, use of drugs, access to condoms and HIV testing, represent significant risk factors in the area for African Americans, as well as offering opportunities for intervention. In addition, little is known about HIV and risk behaviors among the growing Hispanic/Latino and immigrant (primarily African) populations due to language barriers and fear of deportation.

Several gaps in information were identified through the secondary review; many of these have since been rectified with the release of the HIV/AIDS Epidemiology Surveillance Annual Report:

- Lack of current and reliable data on HIV incidence and prevalence surveillance among heterosexuals in the District
- Lack of current and reliable data on the prevalence of HIV drug use and sexual risk behaviors among adult heterosexuals in the District
- Lack of current data on HIV risk behaviors and trend information among various subgroups of heterosexuals (specific racial/ethnic groups such as Latinos, African immigrants, and Asians, drug using populations, homeless, and commercial sex workers)
- Lack of data on effectiveness of local HIV education and prevention programs in the District.

## **2. Mapping and High Risk Area Identification**

### ***Description of Metropolitan Statistical Area***

The Washington-Arlington-Alexandria, DC-VA-MD-WV Metropolitan Statistical Area (MSA) includes the District of Columbia, along with nine counties and six incorporated cities in Virginia, five counties in Maryland, and two counties in West Virginia (1). Within



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the MSA there are two metropolitan divisions: 1) Bethesda-Gaithersburg-Frederick (population 1,068,618), MD and 2) Washington-Arlington-Alexandria, DC-VA-MD-WV (population 3,727,565). The District of Columbia is considered the center for employment, education, healthcare, culture, and entertainment within the larger metropolitan region. For the purposes of NHBS-HET, the MSA was limited to the boundaries of Washington, DC (61.4 square miles of land; 6.9 square miles of water), where the DC Department of Health has jurisdiction.

The geographical divisions within DC include: 29 zip codes, 188 census tracts, 4 quadrants, 8 wards, 127 neighborhoods, and 37 Advisory Neighborhood Commissions. HRA analysis was conducted at the census tract level (where each tract is uniquely identified by a FIPS code) for NHBS. Since the District is neither a “state” nor a “territory”, the Mayor and City Council operate similarly to city, county, and state legislatures. The ward functions as the major political unit within DC, and therefore is the geographic unit of analysis most often used for citywide comparisons along social and economic lines. Additionally, the DC government identifies 39 neighborhood clusters (each with three to five neighborhoods) for the purposes of budgeting, planning, and service delivery (2). The Advisory Neighborhood Commissioners are an important relay of neighborhood concerns to the City Council.

The District of Columbia is home to two rivers: the Potomac River, which forms DC’s southwestern border with Virginia and eventually flows into the Chesapeake Bay; and the Anacostia River, which runs from Bladensburg, MD down through the District for eight miles before converging with the Potomac River at Hains Point in the Southwestern corner of DC. The Anacostia River is a significant demarcation in DC; it is a dividing line between the more affluent parts of DC and Wards 7 and 8 (commonly referred to as ‘East of the River’), where DC’s poorest communities are located. The Anacostia is severely polluted with trash, raw sewage, and sediments and the city has committed to an \$8 billion dollar clean-up and waterfront development project (Anacostia Waterfront Initiative) that is estimated to take 20-25 years (3).

Gentrification is widespread throughout much of DC as indicated by the thriving real estate market – in fact, the real estate boom in recent years is thought to have solidified the neighborhood boundaries and created greater neighborhood name recognition among DC inhabitants. Affordable housing is a major concern for current residents and prospective buyers in DC’s ‘up and coming’ neighborhoods (4). The gentrification process has pushed poor and minority residents to small niches within DC neighborhoods, and census data from 2000 may no longer be accurate in certain areas of DC where rapid change has occurred. Due to the changing nature of the DC MSA, ethnographic research was instrumental in supporting the HRA identification process by substantiating the suspected high-risk areas with observational research.

## **Data Sources**



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To identify the areas of DC with suspected high risk of HIV/AIDS infection, data from multiple sources were used to create a standardized High Risk Area (HRA) index: AIDS case data (5), Population and poverty rates for DC census tracts GIS files of DC census tract boundaries and street network files (6). This was defined and required by the CDC multisite protocol.

First, to obtain AIDS case data, DC DOH/HAA surveillance staff performed an extraction of AIDS cases from the DC HIV/AIDS Surveillance Report (HARS) database using the following criteria: 1) Cases diagnosed between January 1, 2001 through June 2006; 2) Persons age 13 and older at diagnosis; 3) Males and females with heterosexual mode of exposure -OR- females with no identified risk factor (NIR) mode of exposure. Twelve fields were included in the extraction file: address, zip code, ward, state, state FIPS code, gender, race/ethnicity, date of diagnosis, date of entry, vital status, mode of exposure, and StateNo (unique for each case record). NHBS data staff conducted GIS mapping and data manipulation (e.g., geocoding) on the extracted file.

Address information from the extraction file was geocoded to the DC street layer file. A total of 1,619 AIDS case records matched the inclusion criteria, but certain case records were excluded from the geocoding process because the address information was incomplete (i.e., P.O. Box, blank field, homeless) or the current address was not located within DC boundaries (See Tables 1 and 2 for summary information on geocoding and excluded cases). Additionally, we excluded addresses corresponding to jails, hospitals, and HIV/AIDS counseling and testing sites because including these case records would bias the HRA identification process.

Our site struggled with the issue of homelessness because the extracted data were inconsistent in that some homeless cases were coded as 'homeless' in the address field while others had the address of a homeless shelter. With CDC guidance, it was decided that if the homeless shelter included HIV/AIDS counseling and testing services, then the homeless cases with that address should be excluded because including systematic testing and case identification could potentially bias the HRA index values. A consistent method for coding homeless cases upon data entry into HARS should be developed to avoid this issue in the future.

Because Virginia and Maryland state boundaries are quite fluid, HIV/AIDS reporting within the DC borders can be problematic. DC is geographically very small, and persons from neighboring states frequently enter the District for healthcare needs. Only the census tracts within the DC borders are under the jurisdiction of the DC Department of Health; therefore, out-of-state cases from the surrounding MSA are not included in the NHBS analysis. From the extraction, an additional 166 out-of-state case records (most commonly Maryland and Virginia) had to be excluded. Out-of-state cases diagnosed with HIV in the District of Columbia are first reported to the DC DOH/HAA and then are transferred to the respective state's HIV/AIDS database. Cases were included in NHBS if they were out-of-state at initial diagnosis but had updated addresses within DC borders. However, because the DC DOH/HAA does not actively follow cases for



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address changes, the process of updating addresses is passive and only occurs if a new case report is sent to DOH with an updated address for a previous case.

Second, the CDC provided a database file with poverty rates and total population from the 2000 census for each of the 188 DC census tracts. An algorithm developed as a SAS program by the CDC was used to create a standardized HRA index score incorporating AIDS cases and poverty levels at the census tract level. An index score was created for each census tract; higher index scores indicated higher risk while lower scores indicated lower risk. Initially, it was thought that DC DOH/HAA confidentiality restrictions prohibited the use of census tracts with fewer than 5 AIDS cases; however, it was later decided the CDC limit of 3 cases would best serve research purposes and would not compromise confidentiality. Therefore, 62 census tracts were excluded based on small cell size (between 1-4 cases), although tracts with zero cases were still included in the map.

### ***Creating Maps***

The purpose of mapping the HRA index was to identify geographic areas within DC where heterosexuals may be at greater risk of HIV infection. These findings help guide NHBS-HET operations and locate target populations for HIV prevention strategies. A choropleth map was created to thematically display the index scores for each tract based on four categories, with higher index scores represented by darker colors. After consultation with CDC staff, a 20% cut-off point (tracts with top 37 HRA index values) was used to define the HRA Universe. It was later decided that a higher cut-off point (27%, or 50 census tracts) would better represent the four clusters for the purpose of respondent driven sampling and facilitating longer recruitment chains. The HRA universe included tracts ranked up to 51 since one tract in the NW quadrant (ranked 41) was excluded because the HRA value was likely skewed by the private university located in this tract (i.e., low student incomes and no AIDS cases recorded within this particular tract). Census tracts with low population levels and high poverty rates but without AIDS cases were similarly dropped.

The geographic pattern of the DC HRA index was highly concentrated within four distinct clusters (see Figure 1). The largest cluster (#1) was in the SE quadrant of DC, where 46% of the census tracts in the HRA Universe were located. Most of these tracts fell within Ward 8, but the cluster extended west across the Anacostia River to include a few tracts in Ward 6. A second cluster (#2) in Ward 7 represented 16% of the HRA universe. This cluster straddled the border between the NE and SE quadrants and was also defined by Eastern Avenue NE and Southern Avenue SE, which mark the boundary roads between DC and Maryland. Cluster (#3), composed of 18% of the HRA universe, was located mainly in Ward 5 just west of the Anacostia River, but also extended slightly across the border with Ward 6. The fourth cluster represented 20% of the HRA universe and was located in the center of DC, near the border junctions of Ward 1, 2, 5, and 6, all in the NW quadrant. This area consisted of two small HRA groupings, one group near the Downtown/Chinatown area and the other group around

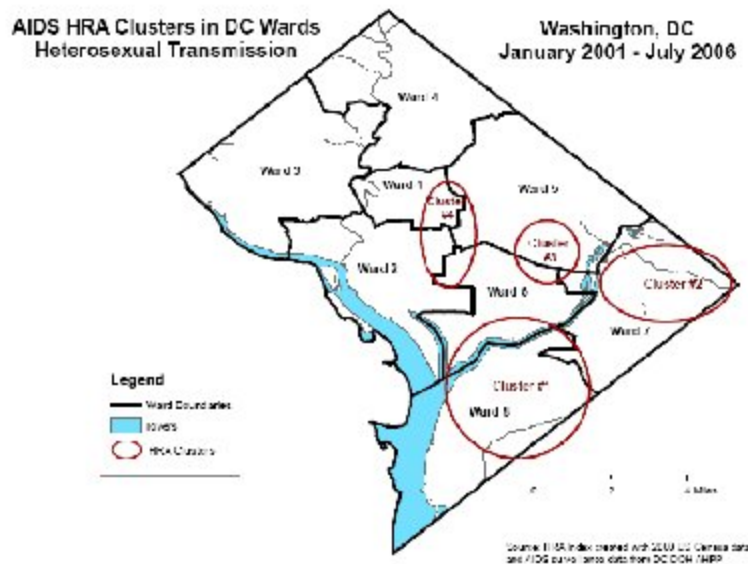


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the Columbia Heights neighborhood (which is partly characterized as a Hispanic and Latino neighborhood including a sizable number of undocumented residents).

**Figure 1: Relationship between HRA clusters and DC Wards.**



In consultation with CDC, eight target tracts (THRAs) were selected within the HRA Universe that naturally clustered together based on HRA ranking and observational research, as well as geographic location; all four HRA clusters are represented by at least one target tract. Since several THRAs share borders with each other, our seed sampling strategy was based on the four clusters rather than planting a seed in each of the THRAs since social networks likely cross census tract boundaries.

### **Co-Location**

From the listing of HIV prevention providers in the District, ten HIV/AIDS counseling, testing, and prevention sites were located within the HRA Universe. The decision to co-locate with one of these sites was based on several factors, such as: proximity to metro and bus lines, relationship with DC DOH/HAA, availability of medical services and office space, access to a mobile medical van, and reputation in the community. Family and Medical Counseling Service, Inc. (FMCS), located in Southeast DC in Ward 8 (within Cluster #1), met these requirements and was selected as the fixed site for NHBS co-location. FMCS also agreed to provide mobile van space for NHBS study recruitment at three mobile site locations at or near each of the target tracts in the remaining three clusters. The choice of FMCS was confirmed through extensive qualitative and ethnographic research as described below.



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### 3. **Qualitative studies and ethnography**

The ethnographic component of the formative assessment provided a unique opportunity to explore individual perspectives of the residents, along with the contextual and geographical settings in which heterosexual men and women live, work and spend time within neighborhoods in the District of Columbia. Ethnographic contributions to the formative assessment were initiated with conducting targeted observations within the documented HRAs identified through the mapping component of the formative assessment. The ethnographic component explored these areas and the vicinity to find out “what is there?” and “who is there” (7) in the four distinct HRA clusters that were identified. The four cluster areas were located in separate distinct places in the District of Columbia, which were centered around well known neighborhoods and housing projects such as: 1) Anacostia/Congress Heights; 2) Lincoln Park; 3) Trinidad;) and 4) Sursum Corda.

#### ***Field Observations***

Field observations supported other data sources regarding the recent gentrification and economic development in many of the neighborhoods within the HRA universe. The windshield tours revealed that there was a potential for discrepancy between the 2000 census data and the current environment within certain HRAs. The significance of this is that people have moved or have to move their residence as a consequence of environmental change and/or gentrification. As a result of this displacement and how it may be associated with HIV risk, questions regarding previous residence and stability of housing were added to the local questions of the NHBS-HET survey.

Each of the four clusters had at least one section in the neighborhood or the vicinity which contained a cluster of commercial properties such as stores, buildings that housed human and social service programs, and other community-based establishments that assist people with meeting their needs. These commercial settings were generally in the form of strip malls. These areas provided a type of local marketplace where residents gathered and participated in social activities. For instance, it was commonplace to observe people congregating around the local barbershop, beauty salon and or beauty supply store, fast food restaurants and stores, liquor stores, and maybe check cashing type businesses. For local residents, these areas serve as hubs for social connections, meeting places and local hangouts. Also, the areas were often locations where activities such as drug dealing, panhandling, fencing stolen merchandise, and sometimes prostitution took place.

#### ***Focus Groups***

A total of 55 individuals were recruited and participated in seven focus groups. Recruitment efforts were targeted in the four HRA clusters for each focus group. Overall, the perspectives of the individuals who participated in the focus groups represented a wide range of values and beliefs. Salient findings included that the



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participants in the focus groups felt the sampling strategy (RDS) would work well, and the incentive would be an important impetus for people to participate in the study and would be sufficient in amount. The majority of the participant expressed positive attitudes about the study but also demonstrated that they understood and found it acceptable to their community.

With regard to HIV testing, focus group comments were mixed, and there was uncertainty whether participants would opt to take the HIV test or not. Participants mentioned two primary issues that might prevent people from taking the test: 1) fear and 2) lack of HIV education among people in the community. However, participants expressed that the incentive would encourage people to agree to participate. Discussants felt the study process of taking the survey, participating in pre-test counseling, taking the HIV test and waiting for results would require too much time for many people. Others expressed that it would not be problematic if people were given very thorough and precise information about what was going to happen during the process, how much time the process would require and what they would get as a result of participating. Participants overwhelmingly agreed that not having to wait for HIV test results would appeal to most people and serve as an incentive for people to participate, which supported the WORD UP choice to use rapid oral tests instead of phlebotomy.

Consistent with the secondary data analysis, the most difficult people to recruit as participants in the focus groups were youth between 18 and 24 years old, particularly young African-American males and Hispanics/Latinos. These two groups were mentioned as being at specifically high risk by the participants in almost every focus group, yet were difficult to engage into the study. For this reason, the research team made the decision to conduct focus groups with young African Americans and special efforts were made to engage the Hispanic/Latino communities.

The combined sources of information from the field observations, the focus group discussions, the secondary data analysis, and the high risk area identification illuminated several key points: a) in recent years, there has been an increase in the rate of reported AIDS cases among Hispanics in Washington, DC; b) the largest concentration of Hispanics are located in the Ward 1 area, and c) little is documented about the networks and network characteristics of the heterosexual Hispanic/Latino community. This finding foreshadowed what was to become the primary challenge for the NHBS-HET study: recruitment of Hispanic individuals into the study. Despite recruitment of multiple Hispanic seeds, key informant interviews, outreach to organizations serving this community, and active door-to-door discussions with Hispanic individuals in Ward 1, we were unsuccessful in initiating any Hispanic referral chains. A thorough investigation of barriers to their recruitment was undertaken by Dr. Peterson and Ms. Montanez, suggested that immigration fears, location across the river, and insularity as a community may have been barriers to recruitment. In an attempt to overcome these barriers and better access this critical community, the WORD UP team established two mobile sites that would be closer to the geographical clustering of this community. We also were granted special exception to recruit a seed from a Hispanic



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majority census tract that was not a target HRA. Though we were able to recruit a seed, this referral chain was not productive. A report on all efforts to recruit this population detailed our findings in this regard. Future NHBS data collection years will examine this phenomenon and identify means of overcoming this challenge.

We asked participants for their knowledge and opinions about various community-based organizations and potential co-location sites. In the groups with individuals who were living in and connected to areas east of the river, FMCS received very favorable feedback as an agency where people would feel comfortable going to participate in the study. In fact one participant stated that “people would run” to participate at that location due to its excellent community reputation.

In addition to assessing barriers and facilitators to NHBS, several characteristics regarding HIV-risk behavior and local environment emerged during the formative assessment:

- Young people between 18 and 24 years old frequently engage in sexual activities with multiple partners
- Most of youth do not practice risk reduction behaviors when engaging in sexual activities.
- People in all age groups were identified as being at risk for contracting HIV. For instance, one of the most conspicuous groups is the older men who “hook up” with younger women.
- Many of the younger women believed to be at risk are connected to drug-using individuals; this not only increases the risk for the woman and her older male partner, but may also increase his spouse’s risk if he is married.
- High incarceration rates among African-American men in Washington, DC may play a role in HIV transmission. The incarceration of men affects individuals and families psychologically, socially and economically. When these men are involved in marriages and common-law relationships, this places the female in the home in a position to devise new strategies for survival. On some occasions these new strategies involve finding new male partners or engaging in sex for money and or access to other resources, or “survival sex.”
- In addition, incarceration among African-American males may serve as a possible link between men who have sex with men (MSM) and heterosexuals. Key informants confirm that among this group there are significant numbers of men who have sex with men and women (MSMW).
- Fueling the increase risk for HIV transmission among individuals who engage in these types of behaviors is illicit drug use. Ecstasy was mentioned as a drug that is popular among young people in the Washington, DC area. However, the most popular drug mentioned among young people seems to be marijuana or “weed.”
- Young people mentioned the existence of “rollers.” Rollers are individuals (usually females, but not exclusively) who “pick-up and go” with whomever to participate in individual and group sex.



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- Other high risk groups mentioned include injection drug users, commercial sex workers, and homeless individuals.

Please note that these findings do not reflect a random sample of participants and thus the formative findings aided us in developing local recruitment strategies and questions, but are not generalizable to the underlying population.

### **Quantitative Findings**

As of the closure date (10/31/07), the WORD UP team had exceeded the accrual expectation of N=750 non-current IDU (no injecting drug use in past 12 months). In total, there were 1,144 interviewees screened, 3.3% were non-randomly selected seed participants. Of those non-seed participants screened, 915 (82.7%) were eligible, of whom 910 (99.5%) completed the interview. Of those, 785 (86.3%) did not report IDU in the past 12 months and were considered non-current IDU. Of those, 750 (95.5%) had complete data available for analysis. Almost half (41.1%) of the ineligible participants were ineligible due to being over or under the eligible age range; 38.3% did not report sexual activity with a person of the opposite sex in the past 12 months. Analyses were conducted on the N=750 non-current-IDU participants on whom complete data were available, consistent with the CDC definition of non-current IDU.

The majority of participants was over 30 (61.4%), Black (92.3%), never been married (61.6%), and reported a heterosexual orientation (89.5%). More than a third (37.6%) had less than a high school degree, and the majority had attained a high school degree or less (85.7%). More than a third (43.7%) of the participants was unemployed, 60.0% reported an annual household income of less than \$9,999, and 21.8% had ever been homeless (with 13.9% currently homeless). Nearly a fifth (18.7%) of participants had no health insurance. Of the participants with health insurance, 91.8% were insured by Medicaid or Medicare. More than half (52.7%) of the participants had ever been to jail, prison, or juvenile detention (lifetime) while 18.6% reported having been arrested by police and booked within the past 12 months. The majority of the sample had never injected drugs (85.9%); 14.1% had injected drugs in their lifetimes, but not in the 12 months prior to the interview. More than two-thirds (60.2%) had used non-injection drugs in the past 12 months. Women were more likely to have never injected drugs than men (90.1% vs. 80.1%,  $p<0.05$ ), but did not differ with respect to use of non-injection drugs in the past 12 months.

Males and females differed significantly in other domains as well. Women were more likely than men to be bisexual (12.9% vs. 3.7%,  $p<0.001$ ), high school graduate/GED recipient or higher (64.3% vs. 58.9%,  $p<0.05$ ), and earn less than \$9,999 annually (65.3% vs. 53.1%,  $p<0.01$ ). Women were also less likely to lack health insurance (11.0% vs. 30.7%,  $p<0.001$ ) and to have ever been in jail, prison, or juvenile detention (36.8% vs. 76.2%,  $p<0.001$ ) than men, as well as less likely to have been arrested by police and booked than men (13.4% vs. 26.5%,  $p<0.001$ ). Women were also more likely than men to have had a partner with a history of being in jail or prison > 24 hours



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(58.1% vs. 22.7%,  $p<0.001$ ) and have an older sexual partner (55.4% vs. 27.7%,  $p<0.001$ ).

The findings of NHBS-HET provide a greater understanding of behaviors that contribute to the epidemic in Washington, DC. These findings indicate substantial risk behaviors in six primary domains:

- Elevated rates of HIV in the District of Columbia found through surveillance are corroborated by the population-based approach found in NHBS;
  - condoms are not being used;
  - awareness of HIV risk factors within stable partnerships, including the need for condom negotiation skills due to high rates of serial monogamy and challenges to maintenance of fidelity;
  - HIV testing had not yet become standard of care at the time the study was conducted and there were substantial missed opportunities for HIV screening;
  - there are considerable correlates of HIV infection locally, including substance abuse, domestic violence, and depression; and
  - HIV prevention services are poorly utilized.
- 
- ✓ **Elevated rates of HIV in the District of Columbia found through surveillance are corroborated by the population-based approach found in NHBS.**
    - Based on anonymous NHBS HIV screening results, 5.2% (95% CI 2.9% - 7.2%) tested as preliminary positive. Initially positive individuals who subsequently were confirmed by Western Blot (WB) as HIV-negative were reclassified as HIV-negative.
    - Nearly half (47.4%, 95% CI 30.9%-78.7%) of those screening HIV-positive did not know their HIV status prior to taking the NHBS HIV test.
    - Women were significantly more likely than men to screen HIV preliminary positive through study-related HIV testing [6.3% (95% CI 3.3%-9.7%) vs. 3.9% (95% CI 1.6%-5.7%), in the weighted population, the test of proportions was  $p<0.05$ ]. Unweighted estimates did not differ significantly between men and women (4.99% vs. 4.39%,  $p=0.712$ ).
    - Of those diagnosed with HIV, 69.2% (n=9) of men and 57.1% (n=12) of women were new positives who did not know their status prior to participating in NHBS testing.
    - Of those diagnosed with HIV, 69.2% (n=9) of men and 57.1% (n=12) of women were new positives who did not know their status prior to participating in NHBS.
  - ✓ **Condoms are not being used.**



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- At last sex, 98.5% reported having vaginal sex and 7.6% reported having anal sex; these were reported as unprotected 71.2% and 100.0%, respectively, with no differences between men and women.
  - Of those who attempted to use a condom during vaginal sex, in 5.7% the condom was not used the whole time.
  - When condoms were used, participants reported using them for pregnancy prevention (6.4%), STD prevention (6.6%), and both (86.4%).
- ✓ **Awareness of HIV risk factors within stable partnerships, including the need for condom negotiation skills due to high rates of serial monogamy and challenges to maintenance of fidelity**
- The majority of most recent sex partners were main partners (74.2%); the remainder were casual (18.9%) and exchange (7.0%) partners. Women were more likely than men to have had a main partner as a last sex partner (78.3% vs. 67.9%,  $p<0.05$ ).
  - More than half of the participants (57.9%) reported having  $\geq 2$  sexual partners in the past 12 months. Women were more likely than men to have only one sex partner in the past 12 months (46.4% vs. 34.8%,  $p<0.01$ ).
  - In estimating partner fidelity to the sexual relationship, 45.9% believed their last sexual partner definitely or probably had sex with someone else during the past 12 months of the relationship. Women were less likely than men to report having had a concurrent sexual partnership in the past 12 months (40.3% vs. 53.0%,  $p<0.05$ ).
  - Nearly half (44.9%) of participants reported that they themselves had sex with someone else during the past 12 months of the relationship.
  - Nearly half (49.7%) of the participants did not know their last sex partner's HIV status; of those who did, 4.3% were believed to be HIV-positive.
  - Participants believed their last sex partners had engaged in risk behaviors in varying frequencies: they believed they had ever injected drugs (7.0%), used crack cocaine (26.0%), and had ever been in jail/prison > 24 hours (44.3%). Almost half of the partners were older than the respondent (44.7%).
- ✓ **HIV testing had not yet become standard of care at the time this study was conducted, and there were substantial missed opportunities for HIV screening**
- A majority of participants (79.7%) had seen a healthcare provider in the past 12 months; of these, nearly half (49.4%) were *not* offered an HIV test.
  - Women were significantly more likely to have seen a doctor, nurse, or other healthcare provider in the past 12 months than men (87.4% vs. 67.0%,  $p<0.01$ )
  - Women were more likely to be offered an HIV test at any of those visits than men (53.3% vs. 44.6%,  $p<0.05$ ).



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- Of those participants who tested preliminary positive and did not know their status previous to study participation, 72.7% (unweighted) had seen a healthcare provider in the past 12 months; of those persons newly diagnosed with HIV who did not previously know their status, 50% (n=8/16) had not been offered an HIV test, and 76.5% of all screened HIV-positive participants had seen a healthcare provider in the past 12 months.
  - The majority (87.9%) had tested for HIV at least once in their lives, with 76.0% of those reporting being tested in the past 24 months, yet only 60.9% in the past 12 months. Men were more likely than women to have had previous oral HIV testing (47.6% vs. 36.3%,  $p<0.05$ ) than blood testing.
  - Three-and-a-half percent (3.5%) reported that their last HIV test was positive, while 6.0% did not *return* for the result of their last HIV test.
  - Nearly a third (31.4%) had heard about the Washington, DC, HIV testing initiative and, of those, 64.1% reported that the initiative “made them want to get HIV tested.”
  - Of those who were not tested, the most common reasons for not having had an HIV test in the past 12 months included being afraid of having HIV (39.7%), not liking needles (33.8%), not having time (23.9%), being worried someone would find out about their test result (28.6%), the perception that they are at low risk for HIV (22.8%), and being afraid of losing family/friends (18.8%).
  - Additionally, there were practical and knowledge deficit reasons for non-testing in the last 12 months, including not having money or insurance for testing (25.7%), worry that name would be reported to the government (19.5%), not knowing where to get tested (17.7%), afraid of loss of job, and insurance, or housing (13.1%), lack of transportation (11.5%).
- ✓ **There are considerable correlates of HIV infection locally, including early sexual debut, substance abuse, domestic violence, and depression.**
- The majority of participants had their sexual debut at 16 years or younger (69.2%) with 23.1% 13 and younger. Women were less likely than men to have sexual debut at age 13 or younger (16.7% vs. 40.3%,  $p<0.001$ ).
  - More than two-thirds (60.2%) had used non-injection drugs in the past 12 months; 14.1% had injected drugs in their lifetimes, but not in the 12 months prior to the interview.
  - In nearly half (48.9%) of the last sexual interactions, drugs and/or alcohol were used (9.5% drugs, 23.1% alcohol, 16.3% drugs and alcohol). Women were less likely than men to report use of either alcohol and/or drugs together at last sex (14.3% vs. 19.4%, respectively,  $p<0.05$ ).
  - There was substantial domestic violence, with 37.9% reporting having ever been emotionally or physically abused, and of those, 29.3% in the past 12 months.
  - Nearly half (43.6%) reported experiencing depressive symptoms in the past week.



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- Women were more likely than men to have depressive symptoms as defined by a CES-D score  $\geq 16$  (48.9% vs. 36.3%,  $p<0.001$ ) and to ever have been emotionally or physically abused (47.6% vs. 25.7%,  $p<0.001$ ).
  - Women were more likely than men to have had a partner with a history of being in jail or prison > 24 hours (58.1% vs. 22.7%,  $p<0.001$ ) and have an older sexual partner (55.4% vs. 27.7%,  $p<0.001$ ).
  - Although it is not a behavior, in view of its status as a correlate of HIV transmission, the proportion of males who reported being circumcised was 56.2%.
- ✓ **HIV prevention services are poorly utilized.**
- More than half (52.3%) of the participants indicated that they had received free condoms in the past 12 months; of those, only 59.5% reported using the free condoms, and 77.3% felt that getting the free condoms made them more likely to use condoms.
  - Men were more likely than women to use free condoms if they got them (63.7% vs. 56.4%,  $p<0.05$ ) but women were more likely than men to perceive that getting free condoms made him or her more likely to use them (86.2% vs. 63.0%,  $p<0.001$ ).
  - Only a small proportion of participants had exposure to HIV prevention activities: relatively few men and women (13.5% and 13.2%, respectively), had participated in any one-on-one conversation about HIV prevention with an outreach worker, prevention program worker, or counselor about ways to protect against HIV and other STDs, and only 9.4% had experienced any group-level intervention, an organized small group session regarding HIV prevention. However, women were more likely to have been exposed to group-level prevention interventions than men (10.3% and 7.5%,  $p<0.001$ ).

## Limitations

There are several limitations to this study. As with most studies of sexual and other HIV-risk behavior, the majority of information is obtained via self-report. Participants may have difficulty recalling the requested information, or may underreport socially undesirable or overreport socially desirable behaviors either consciously or subconsciously. As an interviewer-administered questionnaire, it is possible that there were inter- and/or intra-interviewer differences in the reading of the questions, as well as errors in recording. Extensive training was conducted as well as ongoing quality assurance and supervision to avoid this type of error; however, it does remain possible anytime information is obtained via survey techniques. Characteristics of participant partners (e.g., fidelity to the partnership, drug use) are not confirmed by the partner in question, and must be interpreted cautiously.

The primary biomedical outcome is rapid oral HIV screening testing conducted using OraQuick test kits. Given the relatively low rate of return for confirmatory test results via



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Western Blot, these results and seroprevalence estimates must also be interpreted cautiously. Of those who tested positive at HIV screening, 52.9% did not return for confirmatory testing, 31.8% were known to be HIV-positive, and 8.9% actively refused confirmatory testing. Of those persons who returned for testing and were found to be HIV-negative via Western Blot, the confirmed negative result was used; this will reduce the number of the overall screened positives who could be false positives. This leaves 15 people who did not return for confirmatory testing who were also not known to be HIV-positive. The OraQuick *ADVANCE*<sup>®</sup> Rapid HIV-1/2 Antibody Test (OraSure Technologies, Inc., Bethlehem, PA) cites a sensitivity of 99.3% (95% CI 98.4% - 99.7%) and a sensitivity of 99.8% (95% CI 99.6% - 99.9%). Applying this sensitivity to the 15 people for whom we do not have confirmatory results, we could expect less than one additional false positive test (range: 0.05-0.24). With such a small sample size of 15 based on sensitivity estimates alone, it is unlikely that any of these remaining persons would be false positives; however, it is impossible to know in the absence of confirmatory testing. Please note that the use of screening results differs from the CDC's strong recommendation to use only Western Blot results for analysis.

Use of RDS to generalize study findings to the population is complex. Under the assumptions of RDS, upon achievement of sufficient "waves" of chains of recruitment and under different levels homophily (i.e., how much mixing there is in any given network between people that are very similar ranging to people who are very different from oneself), one can generalize estimates from RDS collected data to the underlying population from which it is drawn (Heckathorn 1997). This is in contrast to a chain-referral system which does not use RDS, which may be systematically biased. The assumptions of RDS may or may not be achieved. For this study, it appears that those that are measurable were achieved; however, a true comparison of the underlying population estimates in comparison with sample estimates is not possible. Based on the use of RDS analytic tools and diagnostics, we believe that we can estimate population-based prevalences of primary outcomes and that there were very few significant differences between the weighted and unweighted prevalence estimates in the overall sample.

In the gender comparisons, however, as the cell sizes became smaller, the estimates became less stable and the effect of weights becomes more pronounced. For example, this may be seen vividly with the weighted comparison of prevalence of preliminary HIV test results between women and men [6.3% (95% CI 3.3%-9.7%) vs 3.9% (95% CI 1.6%-5.7%) RDSAT weighted, vs. 8.1% vs. 2.6% with SAS and exported RDS weights, vs. 4.39% vs. 4.99% unweighted]. The gender-specific proportions of preliminary positives was thoroughly examined, comparing regular individualized weights and then individualized weights adjusting for outliers at the 10% level (i.e., whatever is an outlier beyond the 10% level, it uses the highest number at 10% to replace the outlying variable). There was virtually no difference even taking outliers into account, so the estimates were stable at 2.6% for men and 8.1% for women with the SAS weighted analysis, and 6.3% vs. 3.9% RDSAT weighted. The difference appeared to be the way in which RDSAT and SAS incorporated missing data; future study is underway to more



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thoroughly understand the difference. However, in order to provide the most conservative estimates of HIV prevalence, we have opted to present the RDSAT estimates. We are confident that these estimates are fairly stable because the RDSAT confidence limits contained the SAS estimates, suggesting that although the exact point estimates may not be precise, the inferences should remain the same.

An evaluation of the weight diagnostics (e.g., homophily, network size), revealed that HIV-positive men were most likely to recruit themselves (homophily=0.28 on a scale from 1.0 to -1.0—not high but highest of the other 3 groups) and also had the highest average network size. These two factors combined led to a down-weighting of positive men in our sample, and thus leading to a lower adjusted HIV population prevalence. The converse occurred with the HIV-positive women: they had a low homophily (0.125) and the smallest average network size, so RDS up-weighted them resulting in the elevated HIV prevalence estimate. An exploration of sample equilibrium for gender and HIV status (meaning that we recruited sufficient waves of participants so that the sample composition stabilized) indicated that we would need five waves to reach equilibrium; we had 14, so equilibrium was established. These diagnostic activities suggest that even the gender-specific estimates should be generalizable, under the assumptions of RDS, to the population from which the sample is drawn. Still, it is important to be cautious when interpreting these findings: unweighted estimates are subject to biases that occur with any convenience sampling technique; weighted estimates may be affected by data collection biases that occur with any interview-based study as well as any random or non-random phenomena introduced into the sample via the sampling technique.

## **Strengths**

This study offers the first evaluation of a population-based estimate of risk behaviors that put people at risk for HIV infection in the District of Columbia. Information gained through this study will be useful in developing future studies as well as interventions that can address some of the risks that are being taken locally. Strengths of this study include the use of RDS which, despite complexities described above, provide generalizable estimates of the variables being observed; collection of extensive behavioral information from a large, non-clinic or prevention organization-based sample from the community; use of rapid HIV screening to link behavioral data with clinical biomarkers; use of local prevention questions which allow evaluation of local issues such as the DC HIV testing initiative, condom distribution, use of local prevention services, as well as data collection on additional issues such as intimate partner violence and depression. Unlike clinic-based studies of people that tend to engage in prevention activities or healthcare utilization behavior, NHBS allows a greater understanding of what behaviors are putting people at the risk for HIV in our community as a whole. This less-biased estimate of such behaviors is a critical step towards understanding what public health professionals can do to halt HIV transmission in Washington, DC.



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## Implications and recommendations

- ✓ This study corroborates the elevated rates of HIV suggested by surveillance data in the recent District of Columbia HIV/AIDS, Epidemiology Annual Report (2007).
- ✓ These community-based data suggest that a generalized epidemic among heterosexuals at high risk for HIV based on poverty and location of social and sexual networks around them may be emerging in the capital of the United States, with black women at particular risk.
- ✓ This prevalence in a high risk sample described by NHBS is comparable to heterosexual epidemics in Africa described by population-based surveys: including 5.5% in Cameroon, 4.7% in Cote d'Ivoire, and 6.7% in Kenya. The DC prevalence is higher than estimates found in Rwanda (3.0%), Ethiopia (1.4%), Ghana (2.2%), and among the women is approaching those of Tanzania (7.0%) and Uganda (7.1%).
- ✓ Women in the District of Columbia are at increased risk of HIV, yet their risk behaviors do not always manifest as the traditional risk factors associated with acquisition of HIV, such as having large numbers of sex partners, or many casual or exchange partners. As has been found in other countries and in the Southern United States, the primary risk factor for local heterosexual women may be simply that they are engaging in sex within a network that has a high prevalence for HIV with partners at high risk for HIV.
- ✓ Condoms are not being used. Innovative approaches to teaching condom negotiation skills that are population-specific are rapidly needed.
- ✓ Use of condoms in partnerships that are perceived to be low risk, such as main or stable relationships, may be necessary given the high prevalence of HIV and partnership concurrency in the community. Creating an environment where condom use is consistent is a complicated undertaking, requiring substantive formative work to identify potential interventions, develop and evaluate them. Strategies should be gender-, age-, and risk factor-specific.
- ✓ Condom distribution may be an effective strategy and residents, particularly females, perceive that free condoms increase the likelihood of using condoms. However, rates of condom use and access to prevention services remain alarmingly low, suggesting the need for active intervention on a massive scale.
- ✓ There are substantial correlates that place residents at risk for HIV, including domestic physical and emotional abuse, depression, poverty, lack of healthcare access, and substance abuse. HIV prevention strategies need to incorporate the host of factors associated with HIV risk in the local environment, many which may also be gender-specific.
- ✓ HIV testing was not being routinely offered at the time of this study, and substantial missed opportunities for diagnosing HIV infection occurred, although Washington, DC's routine testing initiative may be associated with increased access to testing as well as the decision to test for HIV. Routine HIV testing should be offered to people engaging in healthcare in any setting, irrespective of



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traditional risk factors. Future NHBS data will allow an evaluation of trends in routine screening over time.

- ✓ Many people do not get HIV tested because they are afraid of finding out they are HIV-positive or do not believe themselves to be at risk for HIV. These individuals may be less likely to return for confirmatory testing or care, and interventions should be targeted to encourage the essential step of immediate linkage into care.
- ✓ Publicizing features of HIV testing may be an effective means to increase access to it. In particular, the availability of free tests and free testing sites, confidentiality regulations that prevent inadvertent disclosure of results, the rapidity of oral HIV testing and the needle-free testing through oral screening. Many individuals did not have an accurate impression of the procedures attendant upon HIV testing procedures locally, and these may be barriers to accessing this critical step in reducing the HIV epidemic in the District of Columbia.

Future data collection years of NHBS will provide an opportunity to compare risk behaviors for HIV between risk populations, assessing the potential for heterosexual, MSM, and IDU-specific strategies. As NHBS becomes routinized in the District of Columbia, we will be able to evaluate secular trends in risk factors by population as well as other individual-level characteristics. This offers a critical opportunity for public health intervention in a region with the highest HIV and AIDS rates in the United States, as well as optimism that this information may be used effectively to rapidly implement innovative strategies to combat this modern epidemic.



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## Appendix 1. Tables and Figures

**Table 1: Summary information – AIDS case data extracted from HARS (January 2001- July 2006).**

Total # extracted cases meeting NHBS-HET criteria	1619
Number of cases excluded from geocoding (see Table 2)	358
Match rate prior to manual manipulation	77% [977 cases]
Final geocoding match rate	90% [1140 cases]
Maximum number of cases in a census tract	24 [Mean=6.06; SD=5.19]
Number of census tracts with zero cases	27
Maximum number of cases in a zip code	164 [Mean=39.3; SD=52.1]
Number of zip codes with zero cases	6
Number of census tracts with population < 1500	20
Number of census tracts excluded by small cell size	62



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**Table 2: Summary of case records *excluded* from geocodable database (January 2001- July 2006).**

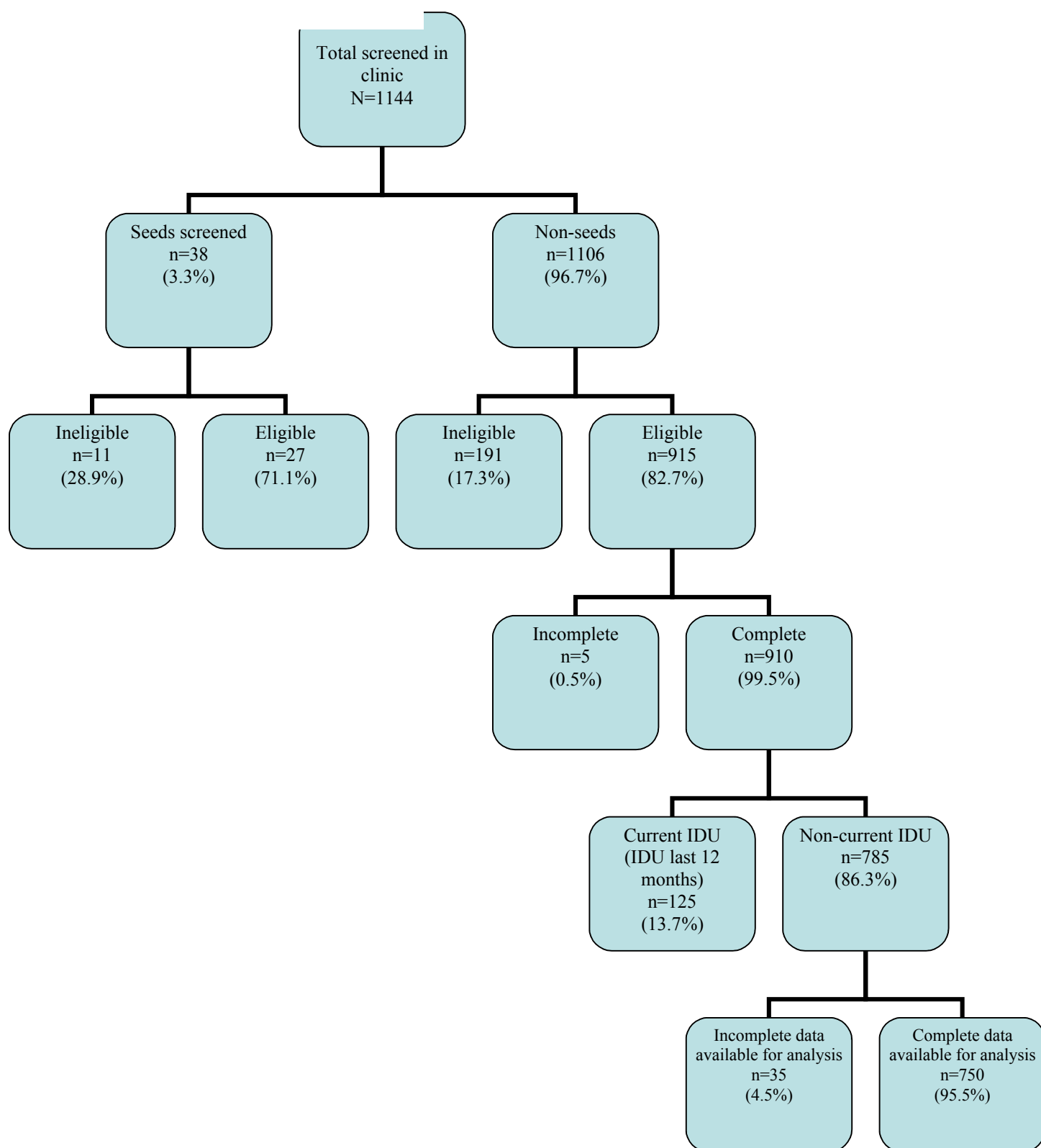
Number of cases with jail as address	111
Number of cases with out-of-state address and no current DC address	166
Number of cases with hospital or CTR as address	26
Number of cases where address includes P.O. Boxes	15
Number of cases with either a blank address, 'No Fixed Address', or 'Homeless' in address field	40
<b>Total excluded 358</b>	



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**Figure 2. Accrual summary.**



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**Table 4. Demographic characteristics of participants (N=750)**

	Weighted %	Unweighted n	Unweighted %
<b>Gender</b>			
Female	60.7	440	58.7
Male	39.3	310	41.3
<b>Age (years)</b>			
18-20	14.5	110	14.7
21-30	24.0	206	27.5
31-40	22.2	151	20.1
41-50	39.2	283	37.7
<b>Race/Ethnicity</b>			
White	2.1	2	0.3
Black	92.3	700	93.3
Hispanic	1.3	7	0.9
Asian	0.0	0	0.0
Other	4.3	41	5.5
<b>Marital Status</b>			
Married or living together	18.0	131	17.5
Separated, divorced, widowed	20.4	133	17.7
Never been married	61.6	486	64.8
<b>Sexual Orientation</b>			
Heterosexual	89.5	671	89.5
Homosexual	1.3	11	1.4
Bisexual	9.2	68	9.1
<b>Educational Attainment</b>			
Less than high school graduate	37.6	270	36.0
High school graduate / GED	48.1	359	47.9
Some college or bachelor's degree	14.3	121	16.1
<b>Employment Status</b>			
Full-time employment	14.6	124	16.5
Part-time employment	14.4	138	18.4
Homemaker, FT student, other	16.8	128	17.1
Retired or disabled for work	10.5	73	9.7
Unemployed	43.7	287	38.3
<b>Yearly Household Income</b>			
\$0 to \$9,999**	60.0	390	54.5
\$10,000 to \$19,999	20.5	159	22.2
\$20,000 to \$39,999	12.8	116	16.2
\$40,000 or more	6.7	51	7.1
<b>Health Insurance</b>			
Have current health insurance	81.3	601	80.1
If yes: insurance type*			



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	Weighted %	Unweighted n	Unweighted %
Private / HMO		65	11.0
Medicaid		508	86.0
Medicare		34	5.8
VA		4	0.7
<b>Housing</b>			
Formerly homeless	7.9	64	8.5
Currently homeless	13.9	87	11.6
Never homeless	78.1	599	79.9
<b>Experience with correctional facilities</b>			
Ever been to jail, prison, or juvenile detention	52.5	398	53.7
Arrested by police and booked in the past 12 months	18.6	134	17.9

*\*Participants could select multiple insurance types.*

*\*\*Difference between weighted and unweighted estimates  $p < 0.05$ .*



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**Table 5. Behavioral and psychosocial characteristics (N=750).**

	Weighted %	Unweighted N	Unweighted %
<b>Injection Drug Use History</b>			
Never IDU	85.9	658	87.7
Former IDU, not in past 12 mo.	14.1	92	12.3
<b>Non-Injection Drug Use</b>			
Use within past 12 mo.	60.2	473	63.1
<b>Depressive Symptoms</b>			
Within the last week, CES-D scale $\geq 16$	43.6	302	41.1
<b>Physical or Emotional Abuse</b>			
Ever abused	37.9	175	37.8
If yes: abused in last 12 mo.*	29.3	67	38.3
<b>Age at Sexual Debut (years)</b>			
0-10	3.3	30	4.0
11-13	23.1	181	24.2
14-16	42.8	329	43.9
17-19	24.0	159	21.2
$\geq 20$	6.8	50	6.7
<b>Number of Sex Partners past 12 mo.</b>			
1	42.1	292	38.9
2 - 3	35.5	257	34.3
4+	22.4	201	26.8
<b>Type of Partner at Last Sex</b>			
Main	74.2	552	73.7
Casual	18.9	160	21.4
Exchange	7.0	37	4.9
<b>Behavior at Last Sex</b>			
Had vaginal sex	98.5	736	98.1
If yes: unprotected vaginal sex	71.2	520	70.8
If used a condom, did not use it the whole time?	5.7	27	12.1
If used a condom, used it to:			
Prevent pregnancy	6.7	17	7.9
Prevent STDs	6.6	21	9.8
Prevent both	86.4	174	81.3
For some other reason	0.3	2	0.9
Had anal sex	7.6	63	8.4
If yes: unprotected anal sex	100.0	52	82.5
If used a condom, used it the whole time?	n/a	10	90.9
<b>Substance Use at Last Sex</b>			



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Alcohol	23.1	171	22.8
Drugs	9.5	71	9.5
Alcohol and drugs	16.3	133	17.7
Neither	51.1	375	50.0
<b>Circumcision (Males Only)</b>			
Ever been circumcised	56.2	199	64.4

*\*Difference between weighted and unweighted estimates  $p < 0.05$ .*



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**Table 6. Sexual and drug use risk behaviors of last sex partner (N=750).**

	Weighted %	Un- weighted n	Un- weighted %
Partner ever injected drugs	7.0	52	7.4
Partner ever used crack	26.0	191	26.9
Partner ever been in prison or jail >24 hours	44.3	341	47.8
Partner is older	44.7	342	45.7
Felt partner definitely or probably or definitely had concurrent sex partnerships last 12 mo.**	45.9	335	49.3
Self report having a concurrent sex partnership last 12 mo.**	44.9	347	48.7
Knew partner's HIV status	50.3	389	52.4
If yes: HIV+	4.3	7	1.8

*\*Difference between weighted and unweighted estimates  $p < 0.05$ .*

*\*\*If last sex partner was an exchange partner (n=37) this question was skipped.*



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**Table 7. HIV Testing Behaviors (N=750).**

	Weighted %	Unweighted n	Unweighted %
<b>NHBS HIV Screening Test Results (OraQuick rapid HIV test)</b>			
Positive	5.2 (95% CI 2.9-7.2)	34	4.7
If positive, new HIV positive	47.4 (95% CI 30.9-78.7)	21	61.8
<b>HIV Testing History</b>			
Ever HIV tested previously	87.9	657	88.0
If yes: test within past 24 mo.	76.0	504	77.0
If yes: test within past 12 mo.	60.9	402	61.2
<b>If yes: result of most recent HIV test**</b>			
Negative	90.4	599	91.3
Never obtained	6.0	42	6.4
Positive	3.5	15	2.0
<b>Specimen Type</b>			
Swab from mouth	41.1	268	41.0
Blood from arm	52.3	347	53.1
Blood from finger	6.5	37	5.7
Urine in cup	0.0	1	0.2
<b>Facility Type</b>			
Community health center / public health clinic	26.2	179	27.3
HIV/AIDS street outreach / mobile unit	12.0	85	13.0
Correctional facility	11.1	68	10.4
Private doctor's office	9.7	59	9.0
HIV counsel & testing site	6.2	49	7.5
Hospital (inpatient)	6.1	35	5.3
Prenatal / Obstetrics clinic	4.3	30	4.6
Other outpatient facility	4.3	33	5.0
Drug treatment program	5.0	25	3.8
Emergency room	3.1	18	2.7
STD clinic	2.6	23	3.5
Adult HIV/AIDS specialty clinic	1.8	6	0.9
Family planning clinic	0.6	3	0.5
Military	0.2	1	0.1
At home	0.6	1	0.1
Other	6.1	41	6.3
<b>Confidentiality of Test</b>			



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	Weighted %	Unweighted n	Unweighted %
Anonymous	32.5	185	28.2
Confidential	65.6	460	70.0
Don't Know	1.9	12	1.8
<b>DC HIV Testing Campaign</b>			
Heard of DC testing campaign	31.4	233	31.4
If yes: made you want to test	64.1	147	63.1

*\*Difference between weighted and unweighted estimates  $p < 0.05$ .*



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**Table 8. Reasons for not having an HIV test in past 12 months (N=343).**

	Weighted %	Unweighted n	Unweighted %
<b>Opportunities for testing</b>			
Have you seen a doctor, nurse, or other health care provider in the past 12 months?	79.7	593	79.2
At any of those times you were seen were you offered an HIV test?	50.6	309	52.3
<b>Reasons not tested past 12 mo.†</b>			
Don't like needles	33.8	116	33.6
Afraid of finding out had HIV	39.7	114	33.0
Didn't have time	23.9	82	23.8
Think at low risk for HIV	22.8	96	27.8
Afraid of losing family / friends	18.8	72	20.9
Worried someone would find out about test result	28.6	64	18.6
Didn't know where to get tested	17.7	59	17.1
Didn't have money or insurance for the test	25.7	53	15.4
Afraid of losing job, insurance, or housing	13.1	34	9.9
No transport to testing place	11.5	30	8.7
Worried name would be reported to the government	19.5	35	10.1
Other	10.5	48	13.9

\*N=343. Includes participants who never tested for HIV (N=89) or who were not tested during the preceding 12 months (N=254).

† Participants could report more than one reason for not having an HIV test in the past 12 months.



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**Table 9. Access to free condoms and participation in HIV prevention interventions (N=750).**

	Weighted %	Unweighted n	Unweighted %
<b>Free condoms in past 12 mo.</b>			
Received free condoms	52.3	417	55.7
If yes: used the free condoms	59.3	271	65.0
If yes: think getting free condoms made more likely to use condoms	77.3	211	77.9
<b>Participation</b>			
Individual level intervention†	13.1	102	13.6
Group level intervention‡	9.4	62	8.3

† One-on-one conversations with an outreach worker, prevention program worker, or counselor about ways to protect against HIV and other STDs.

‡ Organized small group session(s) with discussions about ways to prevent HIV.



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**Table 10. Demographic characteristics by gender, weighted (N=750).**

	<b>Males (N=310) Weighted %</b>	<b>Females (N=440) Weighted %</b>
<b>Age Group</b>		
18-20	15.4	13.6
21-30	23.7	24.5
31-40	18.8	25.2
41-50	42.0	36.6
<b>Race/Ethnicity</b>		
White	4.6	0.6
Black	89.4	94.7
Hispanic	2.1	0.1
Asian	0.0	0.0
Other	4.0	4.6
<b>Marital Status</b>		
Married or living together	18.7	17.5
Separated, divorced, widowed	25.0	17.9
Never been married	56.3	64.6
<b>Sexual Orientation ***</b>		
Heterosexual	95.9	85.2
Homosexual	0.5	2.0
Bisexual	3.7	12.9
<b>Educational Attainment*</b>		
Less than high school graduate	41.0	35.7
High school graduate / GED	44.9	49.8
Some college or bachelor's degree	14.0	14.5
<b>Employment Status***</b>		
Full-time employment	19.3	11.6
Part-time employment	19.9	10.9
Homemaker, FT student, other	8.9	22.4
Retired or disabled for work	12.2	9.7
Unemployed	39.7	45.5
<b>Yearly Household Income**</b>		
\$0 to \$9,999	53.1	65.3
\$10,000 to \$19,999	20.4	20.3
\$20,000 to \$39,999	17.3	9.2
\$40,000 or more	9.3	5.1
<b>Health Insurance</b>		
Have current health insurance***	69.3	89.0
<b>Housing</b>		
Formerly homeless	8.9	6.6
Currently homeless	14.8	14.4
Never homeless	76.3	78.9



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	<b>Males (N=310) Weighted %</b>	<b>Females (N=440) Weighted %</b>
<b>Jail History</b>		
<i>Lifetime</i> : Ever been to jail, prison, or juvenile detention***	76.2	36.8
<i>Past 12 months</i> : Arrested by police and booked***	26.5	13.4

\* p<0.05 \*\* p<0.01 \*\*\* p<0.001



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**Table 11. Behavioral and psychosocial characteristics by gender, weighted (N=750).**

	<b>Males (N=310) Weighted %</b>	<b>Females (N=440) Weighted %</b>
<b>Age of Sexual Debut (years)***</b>		
0-10	6.2	1.5
11-13	34.1	15.2
14-16	32.8	49.5
17-19	18.4	28.2
20+	8.5	5.7
<b>Number of Sex Partners **</b>		
1	34.8	46.4
2 – 3	33.4	36.4
4+	31.8	17.2
<b>Type of Partner at Last Sex*</b>		
Main	67.9	78.3
Casual	25.1	14.8
Exchange	7.1	6.9
<b>Behavior at Last Sex</b>		
Had vaginal sex	98.0	98.8
If yes: unprotected vaginal sex	71.1	71.1
Had anal sex†	9.2	6.9
If yes: unprotected anal sex†	n/a	n/a
<b>Substance Use at Last Sex***</b>		
Alcohol	34.9	15.9
Drugs	8.0	10.5
Alcohol and drugs	19.4	14.3
Neither	37.8	59.2
<b>Injection Drug Use History *</b>		
Never IDU	80.1	90.1
Former IDU, not in past 12 mo.	19.9	9.9
<b>Non-Injection Drug Use</b>		
Use within past 12 mo.	63.0	58.3
<b>Depressive Symptoms***</b>		
Within the last week, CES-D scale ≥16	36.3	48.9
<b>Physical or Emotional Abuse***</b>		
Ever abused	25.7	47.6

[Need to put in asterisks—Kath—can you check if these are the right ones?]

\*  $p<0.05$  \*\*  $p<0.01$  \*\*\*  $p<0.001$



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**Table 12. Sexual and drug use risk behaviors of last sex partner by gender, weighted (N=750).**

	<b>Males (N=310) Weighted %</b>	<b>Females (N=440) Weighted %</b>
<b>Last Sex Partner</b>		
Partner ever injected drugs	7.0	7.4
Partner ever used crack	23.9	26.8
Partner ever been in prison or jail >24 hours***	22.7	58.1
Partner is older ***	27.7	55.4
Felt partner definitely or probably had concurrent sex partnerships last 12 mo	41.6	47.9
Self-reports having concurrent sex partnership last 12 mo *	53.0	40.3
Knew last sex partner's HIV status	50.1	50.5

\*  $p<0.05$  \*\*  $p<0.01$  \*\*\*  $p<0.001$



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**Table 13. HIV testing behaviors associated with gender, weighted (N=750).**

	<b>Males (N=310) Weighted %</b>	<b>Females (N=440) Weighted %</b>
<b>NHBS HIV Screening Test Results</b>		
<b>(OraQuick rapid HIV test)</b>		
Screened positive	3.9 (n=13)	6.3 (n=21)
If yes: Newly HIV-positive †***	69.2 (n=9)	57.1 (n=12)
<b>DC HIV Testing Campaign</b>		
Heard of DC testing campaign	28.0	33.3
If yes: made you want to test	63.7	63.6
<b>HIV Testing History</b>		
Ever HIV tested previously	83.5	90.7
If yes: test within past 24 mo.	69.4	79.3
If yes: test within past 12 mo.	57.7	62.7
<b>Specimen Type*</b>		
Swab from mouth	47.6	36.3
Blood from arm	47.1	56.6
Blood from finger	5.3	7.1
<b>Facility Type††</b>		
Community health center/public health clinic	21.6	29.6
Correctional facility	19.7	5.1
HIV/AIDS street outreach/mobile unit	12.3	14.6
HIV counsel & testing site	9.2	6.3
Drug treatment program	7.1	1.9
Hospital (inpatient)	5.4	5.4
Private doctor's office	5.1	13.0
STD clinic	3.8	1.9
Other outpatient facility	3.2	5.1
HIV/AIDS specialty clinic	2.2	0.7
Emergency room	1.3	4.2
At home	1.0	0.0
Military	0.2	0.0
Family planning clinic	0.0	0.2
Prenatal/Obstetrics clinic	0.0	7.2
Other	7.9	4.8
<b>Confidentiality of Test</b>		
Anonymous	29.5	34.6
Confidential	66.7	64.6
Don't Know	3.8	0.8
<b>Free condoms in past 12 mo.</b>		



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Received free condoms	47.8	55.0
If yes: used the free condoms*	63.7	56.4
If yes: think getting free condoms made more likely to use condoms***	63.0	86.2
<b>Participation</b>		
Individual level intervention	13.5	13.2
Group level intervention	7.5	10.3
<b>Opportunities for testing</b>		
<i>Have you seen a doctor, nurse, or other health care provider in the past 12 mo?***</i>	67.0	87.4
<i>At any of those times you were seen, were you offered an HIV test?</i>	44.6	53.3

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†Unstable estimate using RDSAT; unweighted estimates reported.

††Weighted from SAS instead of RDSAT

\* $p < 0.05$  \*\*  $p < 0.01$  \*\*\*  $p < 0.001$



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## Abbreviations and Acronyms

<b>AIDS:</b>	Acquired Immunodeficiency Syndrome
<b>CDC:</b>	United States Centers for Disease Control and Prevention
<b>CES-D:</b>	Center for Epidemiologic Studies-Depression screening tool
<b>DOH:</b>	District of Columbia Department of Health
<b>GWU:</b>	George Washington University
<b>HAA:</b>	HIV/AIDS Administration
<b>HAART:</b>	Highly Active Antiretroviral Therapy
<b>HIV:</b>	Human Immunodeficiency Virus
<b>IRB:</b>	Institutional Review Board
<b>IDU:</b>	Injection Drug User
<b>MSM:</b>	Men who have sex with men
<b>NHBS:</b>	National HIV Behavioral Surveillance
<b>NHBS-HET:</b>	National HIV Behavioral Surveillance, heterosexuals at risk of HIV data collection year
<b>NHBS-IDU:</b>	National HIV Behavioral Surveillance, IDU data collection year
<b>NHBS-MSM:</b>	National HIV Behavioral Surveillance, men who have sex with men data collection year
<b>RDS:</b>	Respondent-driven sampling
<b>RNI:</b>	Risk Not Identified
<b>STD:</b>	Sexually Transmitted Disease
<b>SPHHS:</b>	School of Public Health and Health Services
<b>VBS:</b>	Venue-based sampling
<b>WORD UP:</b>	Washington Outreach Research Drive to Understand Prevention; the local name of NHBS in Washington, DC, conducted by GWU SPHHS.



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**What are other references I can look to about RDS, generalized epidemics, behavioral surveillance, or HIV among subpopulations?**

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